

THE IRON AGE

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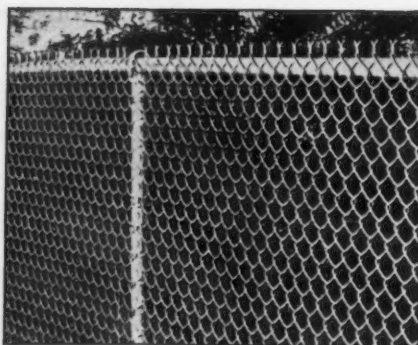
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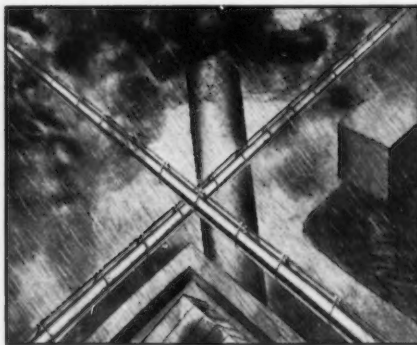
4 Years of achievement for **Bethanized Wire**



IN 1933 Bethlehem introduced a new kind of zinc-coated wire with a coating applied by electricity. This wire, known as bethanized wire, had a coating so different, so superior in every characteristic that it was like a new metal. It was so ductile and tightly bonded to the base wire that the most drastic bending and twisting could not cause it to flake or peel. The coating was uniform in thickness, providing full protection at all points, and was so pure (99.99 per cent) as to be practically immune to attack by even the most sulphur-laden atmosphere.



IN 1934 the ability of bethanized coatings even in heavy weights to stand severe fabricating operations resulted in the use of bethanized wire for making chain-link fence. Before the development of bethanizing no heavily zinc-coated wire was available that would stand the weaving operation. The necessary heavy coatings cracked and flaked in fabrication, greatly reducing their protective value. Consequently it had been the practice to galvanize the fence after weaving. Bethanized wire eliminated this difficult operation and also brought superior appearance and lasting qualities to this type of fence.



IN 1935 an important manufacturer of strand started using bethanized wire in his product. Bethanized wire is peculiarly suitable for this purpose because of the heavy weight of coatings that it can carry without damage in fabricating, and the high durability of the zinc resulting from its extreme purity. The purity of the zinc is especially important in strand, as contamination by iron, occurring with coatings applied by other methods, opens the door to attack by acids resulting from sulphur gases in the atmosphere. Strand is often used in highly-corrosive, sulphur-laden industrial atmospheres.



IN 1936 bethanized farm fence was placed on the market. At that time it was predicted that this marked the beginning of a new era in fence manufacture, as in both appearance and lasting qualities bethanized fence set entirely new standards. Recent developments have borne out this forecast, as this new fence made an instant hit, sales have been limited only by production facilities, and a trend toward electrical coatings has developed in the industry. Bethanizing gives farmers the opportunity to obtain a super-fence of tried-and-proved dependability that is good for many extra years of service at no extra cost.

★ ★ ★ ★ ★

These are the high spots of the four years that bethanized wire has been made. A multitude of other uses have been found for this new kind of zinc-coated wire, ranging from small springs to telephone and telegraph wire, and it is steadily finding an even broader field of usefulness.



BETHLEHEM STEEL COMPANY

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APRIL 22, 1937

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Gas-Tronomics

BUSINESS seems to be coming out second best, nowadays, in political and labor matters. One reason, perhaps the chief one, is that business men have neglected mass psychology, whereas politicians and labor leaders have specialized in it.

Business men, especially those who supervise the running of industrial organizations, have neglected mass psychology because they have been so busy doing other things. First, they have had to acquire an extensive knowledge of the technical aspects of their businesses. No small job. Then they have had an equally difficult task in mastering the intricate principles of marketing. After that, they have the truly Gargantuan task of coming through a 10-year period with something left in the treasury.

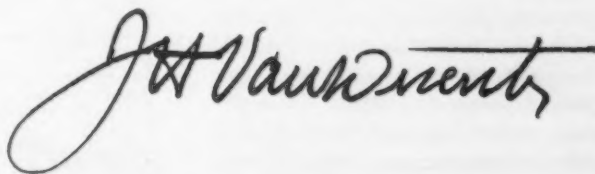
The politician and the labor leader do not need to spend their time acquiring all this information and for that reason can give their time to the science of Gas-Tronomics. This is a special division of mass psychology which consists of the technique of making the greatest number of people swallow what the politician or the labor leader has to offer at the moment.

Chloroform is not used in the operation of inducing people to swallow what plain common sense should tell them is not good for them. But three powerful gasses are used and the methods of using them and timing them constitute the chief bag of tricks of the politician and the labor leader. Hence the term Gas-Tronomics.

The first gas is the hope gas. This makes people believe that everything will be all right. If presidents of private concerns knew as much about using this gas as do politicians, they could keep their companies in red for seven or eight years at a stretch and still get the enthusiastic endorsement of their stockholders.

The wise politician always keeps either a depression or a recovery "just around the corner." When things look bad, it's time for the hope gas. When they look good, the fear gas comes into play.

So much for politicians. Labor leaders also are expert in the use of these two gasses, but they and some politicians too use a third gas much more deadly in effect. It is known as the hate gas and the people who breathe or swallow it will carry scars for the rest of their lives.



Open-Hearth Operators Swap



ASSEMBLING for the first time in the deep South, the 1937 national open-hearth conference at Birmingham, Ala., was a more conspicuous success than officers of the American Institute of Mining and Metallurgical Engineers had anticipated. Over 200 members made the long trip south on April 7, and total registration was about 270, which betters the previous record of 258, established at the 1936 meeting at Detroit. In addition to the registration for the open hearth sessions, an additional 175 engineers gathered at the same time to hear and present papers before the Blast Furnace and Raw Materials Committee. This was the first time the open-hearth and blast furnace groups had met for parallel sessions since 1927.

All technical discussions of both groups were held in ballrooms of the Hotel Tutwiler, Birmingham, on Wednesday and Thursday, April 7 and 8. The open-hearth operators confined their discussions to refractories, furnace construction, quality and metallurgical problems, and an extended session on general practice technique; the blast furnace group was mostly concerned with raw materials, construction and operation of blast furnaces, and the use of iron and slag. Both groups, about 450 to 475 altogether, devoted Friday, April 9, to an all-day inspection trip of the mining and steel-making properties of the Tennessee Coal, Iron and Railroad Co.

At the business meeting the committee voted to hold next year's meeting at the Hotel Statler, Buffalo, N. Y., the week of April 17.

Opening the initial session of the open hearth meeting on Wednesday morning with a few words of greeting, G. D. Tranter, general chairman, pointed out that fuel efficiencies, refractories, insulation, furnace control, furnace construction, safety, quality control, and raw materials all are subjects which

THIS MORNING

by JOHN TEMPLE GRAVES, II

"Tis not the king's stamp can make the metal better."

BIRMINGHAM welcomes this Wednesday the nation's foremost scientists of metal. In the great valley which the Lord has flanked with coal and iron and floored with limestone there assemble today representatives of nearly all of the important iron and steel companies in North America. They are here for a joint session of the twentieth national open hearth convention and the blast furnace and raw material division of the American Institute of Mining and Metallurgical Engineers. Among them is the institute's president, Mr. R. C. Allen. To him and to all who accompany him Birmingham offers the salute of a city whose very existence is a comment upon the science they serve.

Within radius of a few miles from the Tutwiler where these gentlemen assemble are billions of tons of iron ore and more billions of coal. If the removal of those tons in years to come is to bring maximum benefit to those by, for and among whom they are removed, science must superintend more faithfully each year. Economic science, social science, physical science.

The several hundred thousand of us here who are not metallurgists can offer nothing to the profundities in which our distinguished visitors will engage. But we can point them with hospitality and pride to our city, to the special favors Providence bestows upon its vicinities in Spring, to the pool of stars its night lights make from the rim of Red Mountain, to majesties of architecture and landscape imposed upon glories of hill tree, to a civic-mindedness that makes us hospitable in special measure to the science that created us and keeps us alive.

Anent his conviction that Franklin Roosevelt loves Southern agriculture but has no heartbeats for Southern industry, President Scott Roberts, of the Alabama Chemical Manufacturers Association,

should be discussed, and he predicted that many worthwhile ideas would be developed. In this country the entire steel industry is in a state of flux, and many new ideas are being proposed; and, Mr. Tranter said that open hearth men must try not to be either reactionary or ultra-conservative. The open hearth process has certain inherent defects, and operators must not blind themselves to them. It is known that heat transfer in the open hearth furnace is not as efficient as it should be; consequently a different method of heat application or the development of greater heat resisting roof brick may be the answer. The present method of casting steel into ingots is most certainly not the ultimate nor all that can be desired, according to Mr. Tranter. Since the advent of hot and cold strip mills with the resultant pouring of large slab ingots, it becomes more and more clear that sooner or later another method of pouring should be devised to eliminate excessive segregation in the top of such ingots. He also stated that several plants are working on a method of direct pouring of steel between water cooled rolls. Many operating difficulties must be solved, however, before such a scheme becomes practical.

High-Magnesia-Ferrite-Bonded Refractory

Following the opening remarks by Mr. Tranter, the session on refractories was initiated by a lengthy discourse on hearth refractories for steel making by William J. McCaughey, of Ohio State University. He stated that in attempting to prepare a magnesia refractory bonded with calcium ferrite, difficulty was encountered in obtaining a suitable source of magnesite which would contain only a small amount of silica in the calcined product. The silica requires an additional amount of lime to be added to the refractory to convert the magnesium silicate (serpentine) into dicalcium silicate before

Ideas at Birmingham

By T. W. LIPPERT

Metallurgical Editor, THE IRON AGE

any ferrite bond is developed. The necessity of adding 2 lb. of lime to neutralize 1 lb. of silica before developing the ferrite bond made it desirable to seek a source of pure magnesite or its equivalent.

Mr. McCaughey continued by stating that it was thought possible to beneficiate the dolomites of northwestern Ohio by removing most of the lime. Since these dolomites contain only very small amounts of silica, this would furnish a suitable supply of pure magnesia. During the development of such a process, a deposit of brucite (magnesium hydroxide) was found in Nevada. The brucite in Nevada occurs in massive deposits and is remarkably free from siliceous impurities, or the impurities are in such coarse fragments that they are easily removed in the mining operation. The availability of such a deposit of high magnesia, low silica mineral made it desirable to use such a mineral deposit before a magnesia separation process based on dolomite was completely reduced to commercial practice. Brucite, when calcined, yields magnesium oxide which is particularly suitable for the commercial development of a calcium ferrite bonded magnesia refractory.

The manufacture of a calcium ferrite clinker, continued Mr. McCaughey, calls not only for a low-silica source of magnesia, but also for careful proportioning of the lime with respect to the silica and iron oxide, and careful furnace control to insure the formation of calcium ferrite.

With careful control of raw materials and firing, a calcium-ferrite-bonded-high magnesia refractory was made, of approximately the following composition: SiO_2 , 2.5; Fe_2O_3 , 7.0; Al_2O_3 , 1.0; CaO , 10.0; and MgO , 79.5. The calcium ferrite developed in this refractory produces hard, dense, refractory granules having a bulk density of 125 to 135 lb. per cu. ft., and a true specific gravity of about 3.6.

Earl C. Smith

Chief Metallurgist
Republic Steel Corp.

described his recent tour of foreign steel-making plants, at the Wednesday, April 7, luncheon of the A.I.M.E. convention of open-hearth and blast furnace operators, Hotel Tutwiler, Birmingham, Ala.

* * *

MR. SMITH SAID:

"**G**ERMAN steel mills have made themselves practically independent of outside scrap supplies through the use of basic bessemer converters and open hearths. In some instances they use up to 100 per cent mill scrap. Scrap from the basic bessemer (about 11 per cent) goes into a low-grade open hearth, which in turn feeds its scrap into a high-grade open hearth, the scrap from which is in turn fed into very high grade electric furnaces. Thus, a single plant will have four types of melting and refining units and will be making everything from low-grade plain steels up to the highest quality of alloy material. In all probability, if the stringency in American scrap continues, steel makers here will adopt a similar practice."

* * *

"**B**LAST furnaces at Corby, England, are using 29 per cent Fe ore of 0.2 to 0.8 per cent sulphur, and are desulphurizing in the ladle and in basic mixers with soda ash, hydrogen and steam (the quantity of soda ash equals about 1 per cent of the iron). A plant in Saarbrücken, Germany, uses liquid soda ash for the same purpose, and drops sulphur from 0.08 to 0.04. The English iron made by the soda ash process is very high grade, and, with an equivalent labor cost of about 40c. per hr., the production cost is \$9 a ton, or even \$1 or so less in certain instances."

* * *

"**R**USSIAN steel makers are turning out plain and alloy steel about equivalent to the best in the United States. Next year they probably will be the world's second largest producers."

Mineralogically, such a refractory consists of about 79 per cent periclase, 13 per cent calcium ferrite, and 8 per cent calcium silicate, according to Mr. McCaughey. At furnace temperature, the calcium ferrite fluxes part of the calcium silicate, producing some 16 per cent of bond. Sufficient calcium ferrite is formed to rapidly set the refractory in the furnace. However, the amount of both calcium ferrite and calcium silicate is maintained as low as possible in order to avoid refractory dilution. Magnesia is kept as high as possible to provide a maximum amount of periclase which gives permanence to the refractory and resistance to iron-rich slags.

The high density of the refractory and the ability of the refractory to coalesce, produces a dense monolithic hearth of high magnesia content having a maximum resistance to iron-rich slags, which is so necessary with low carbon steels.

Based on these principles, a carload of this high-magnesia, calcium-ferrite-bonded refractory was manufactured and a trial undertaken on a 150-ton furnace at one of the large steel companies. Objections on the part of the melter to using this new refractory, Thomasite, without slag admixture had to be overcome. However, Mr. McCaughey, stated that to remove the prejudice of the melter against applying the refractory without slag, two test samples were run on the breast of the furnace on top of raw dolomite, one with slag, and the other without slag. The sample without slag knitted together to form a solid cake over the mound of raw dolomite. One of the rods used for shaking down a heat was placed over the refractory and, when the refractory was pulled out of the furnace afterwards, a clear impression of the rod was seen in the solid refractory cake. After this demonstration, the melter used the material as recommended and

without slag admixture. The calcium-ferrite-bonded magnesite was used over a period of days on the one furnace with satisfactory results.

During the test, Mr. McCaughey continued, a bad hole developed in one of the adjacent furnaces. This hole was of such large proportions that ordinarily magnesite would have been used for patching and considerable time spent on putting in the patch. At the suggestion of the melter, this hole was repaired with several layers of the new material, and patching was accomplished in short order. The patch was very satisfactory and withstood regular furnace operation during the week that the trials were run.

Mr. McCaughey said that in order to distinguish it from other basic refractories, the high-magnesia-ferrite-bonded refractory has been given the name Thomasite in honor of the man who developed both the basic open hearth process and also the refractories that made it possible.

New Inland Furnaces

Following the discussion on refractories, a description was given by B. L. Hutchinson of Inland Steel Co.'s new open-hearth furnaces. He stated that in January, 1936, the Inland Steel Co. decided to proceed with the construction of four new open-hearth furnaces, to be built in line with the present 15-furnace shop. These furnaces, which are now in operation, are of 150-ton capacity each. The overall dimension outside the brick work is 70 ft. 1 in., this length being limited by the decision to hold to the same building design as in the old shop. This meant that these 150-ton furnaces had to be built into bays which were 80 ft. center to center, the same as the old 125-ton furnaces, which in turn had been originally designed for 80-ton furnaces. In order to provide hearth capacity, checker capacity and sufficient size of uptakes and give due consideration to brick economy from the standpoint of gas velocities in the furnace system, every bit of available space had to be made use of and some interesting departures from orthodox construction were necessary. To obtain the desired capacity and hold within the limiting overall length, a 33-in. depth of bath was required. The hearth is 16 ft. wide and 43 ft. long inside of brick at foreplate level,

making a total of 623 sq. ft., or an area of 4.15 sq. ft. per ton of steel produced.

Mr. Hutchinson continued by stating that the bottom consists of 18 in. of dead burnt magnesite at taphole, on 6 in. of plastic chrome, on 15 in. of firebrick, on 2½ in. of insulating brick, on 1 in. of Thermo-flake concrete. Side walls are of first quality firebrick and chrome brick covered with plastic chrome. The firebrick is battered from 27 in. to 13½ in. at the foreplate, and is faced with 9-in. chrome brick laid as headers to take care of expansion. Plastic chrome is 4 in. at the bottom and is battered to 2 in. at the foreplate, front and back. The front wall above the foreplate consists of a 22½-in. wall battered to 18 in. at the skew, the top 12 in. being silica brick with chrome brick below. The sloping backwall is covered with 9 in. of firebrick and 9 in. of chrome brick all laid as headers.

The furnace roof is of 16 in. silica brick with 22½ in. thickness 6 ft. out from the backwall. There are two 18-in. rib courses, one over each end door. The distance from foreplate to skewback is exactly 5 ft. The rise of the roof arch is 30 in. Roof insulation consists of 2 in. of Thermo-flake granules covered with a 1-in. coating. The insulation is put on after the furnace is up to temperature.

The uptakes have a combined area of 83 sq. ft., and the throat area at the bridge wall is 92 sq. ft. The front end panel is constructed of 22½ in. of bonded chrome; the back end panel of 18 in. of Metal-kase.

The regenerator roof is a flat suspended arch of 12-in. brick insulated by 1 in. of granules, covered with ½ in. of insulating cement. The neck arches are also suspended and lead to a suspended nose arch of the Simplex interlocking type at the slag pocket end. Regenerator roof construction is of first quality firebrick, while the neck arches and nose are of super quality firebrick. The throat between slag pocket and checkers is 14 ft. 2 in. in length. Sides flare from 14 ft. 5 in. at the slag pocket to 24 ft. 9 in. at the checkers. The opening at the top of the bridge wall into the checkers is 3 ft. 6 in. x 24 ft. 9 in., or approximately 90 sq. ft. in area. This type of construction provides a slow even flow

of gases with good distribution of heat to the regenerators.

The checker chambers are 24 ft. 9 in. in width by 20 ft. 3 in. in length. Checkers themselves are of the Loftus type with a heating surface of 26,780 sq. ft., which is equivalent to 178 sq. ft. of area per ton of hearth capacity. The checker openings are 6 in. sq. in all directions. The height from the floor to the top of the checkers is 18 ft. 6¼ in. The depth of checkers varies from 13 ft. 4 in. at the flue entrance to 14 ft. 5 in. at the bridge wall. The walls are of firebrick 22½ in. thick backed up with 4½ in. of insulating brick on which is laid a 1-in. insulated coating. The floor consists of 4½ in. of firebrick laid on 5 in. of insulating brick. Thermocouples are set in the front bulkheads at the basement floor level.

Mr. Hutchinson continued his description of the Inland furnaces by stating that the furnaces are equipped with waste heat boilers of the horizontal fire tube type of Inland's own design. There is a superheater ahead of the boiler. The boilers are rated at 20,000 lb. steam per hr. at 210 lb. pressure. An induced draft fan is set at the end of the boiler with a rating of 45,000 cu. ft. per min. It is driven by 125 hp., 750 r.p.m., a.c. motor.

Dampers are all Blaw-Knox water cooled. The stack is 165 ft. high, 6 ft. inside diameter and is lined with 6-in. blocks.

Oil or Gas Fuel

The fuel on these furnaces is oil or oil and coke-oven gas. Tar can also be used. Oil is atomized by steam from the boiler superheaters. Individual furnace oil heaters, using steam as the heating agent, keep the oil at a constant temperature. This temperature is thermostatically controlled, and a thermometer indicates the oil temperature on the operating panel. A positive displacement oil meter and recorder shows the total oil consumption and an indicator on the panel shows the instantaneous rate in gal. per hr. The flow of oil is set by micrometer valves. In the fuel lines at each end of the furnaces are motor operated valves protected by a water cooled jacket. These are controlled by a switch on the instrument panel. Closing the valve for furnace reversal breaks the circuit controlling the induced draft, leaving louvres open which

allows the other valve to be opened quickly.

Furnace reversals are controlled electrically by a master switch.

Up to the present time, none of these furnaces has completed a campaign, the oldest of which has 415 heats in addition to the bottom. It is therefore not possible to give any results or draw any very definite conclusions as to ultimate performance, except that furnace operation to date has been very satisfactory. At 415 heats the only

ingredients were mixed cold in a concrete mixer and rammed in for the full thickness in the furnace. Mr. Scott stated that the first cold bottom was made up of 80 per cent screened magnesite and 20 per cent of bonding material, the latter being made up of cold setting plastic chrome cement, tar, and other ingredients. Later, the bonding material was changed to 5 to 8 per cent of a water solution of sodium silicate (just enough to make the magnesite plastic). What other

hearth brought forth a spirited discussion. H. G. Grim of the Hepenstall Co. stated that the economic use of natural gas on an open hearth depends on local plant conditions. His experience with natural gas was limited to low pressure applications with natural draft, and he stated that the difficulty with low pressure natural gas is in getting a high flame temperature with the proper luminosity.

The accepted use of fans on

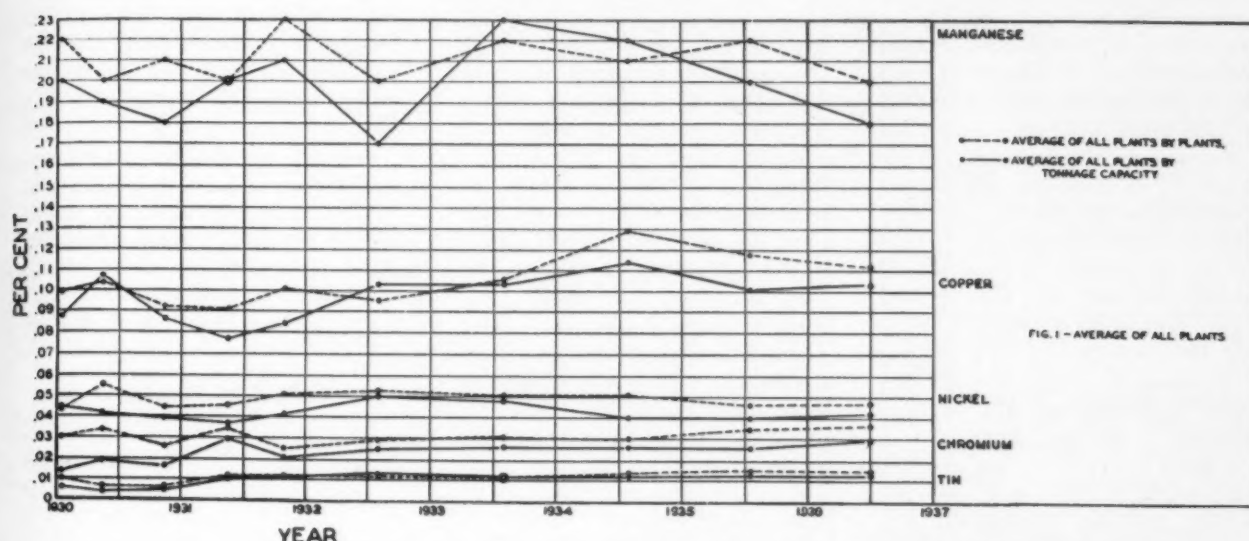


FIG. 1—Variation in residual metals in the open hearth since 1929. Although there is some change from year to year, there is no significant trend line for any of the important metals.

brick repairs have been on the front wall.

Mr. Hutchinson concluded by stating that the oil consumption per each furnace is 29 gal. per ton on steel which is tapped with a bath analysis of 0.05 per cent carbon.

Quick Bottom

Several of the steel companies ravaged by floods during the past year had interesting experiences in putting in new open-hearth bottoms with a minimum loss of time after flood waters receded. Although one superintendent reported burning in a new bottom in 126 hours, the attention of the meeting was centered in a report by T. T. Scott, of Sheffield Steel Corp., who mentioned putting in a cold bottom and having it ready for an all-scrap charge in 72 hr.

The thinnest section of this cold bottom was 6 to 8 in. near the tap hole, ranging up to 14 in. in the thickest section. The bottom in-

ingredients were in the new bonding material, if any, Mr. Scott refused to disclose despite numerous leading questions by open-hearth men in attendance.

This bottom has operated for many months (526 heats) on heats varying from ingot iron (0.02 C) to 0.100 C, and so far the plant has experienced less trouble than usually arises for a conventional hot-set bottom. Mr. Scott mentioned that it is possible to have a heat on in a furnace within 24 hr. rather than 72 hr., if such speed is absolutely necessary.

Several operators, however, were of the opinion that it is unwise to put in a bottom so quickly. Their contention was that inasmuch as a bottom stays in for years, a slow burning in of a new bottom will in the long run show greater efficiency and require less attention.

Natural Gas in Open Hearths

Several queries regarding the use of natural gas for firing open

open-hearth furnaces should allow for increased heat transfer in checkers. This fuel being clean, smaller checker openings should be practical and the increased benefits of higher air preheat capitalized.

Mr. Grim continued by stating that the cost of the gas in Pittsburgh compared with low sulphur fuel oil on a b.t.u. basis is favorable, but the oil furnace usually makes better time. Natural gas has lots of advantages over oil, such as no storage, piping system, no need for an atomizer, lack of need of preheating, etc., but the time element is usually the reason for using fuel oil.

The type of port used with gas depends upon the operator. There are innumerable designs and all are the best. Most of them accomplish the same thing and all of them must be so shaped and sized as to give the proper velocity and direction to the flame. Most gas furnaces have hipped roofs or roofs with valleys. The type of roof con-

struction is somewhat dependent on the port construction. The construction of the port is the crux of the furnace operation in using low pressure natural gas. The areas of checker fantail, uptakes, and port must be kept in proper proportions and limits in which one works are very narrow.

Following Mr. Grim's comments, George M. Coughlin, of the Ashland division of Armco, stated that natural gas throughout the country ranges in heating value from 1000 to 12,000 B.t.u. depending on the field being used. Also, these same gases range in specific gravity from 0.6 to 0.68. Because of these variations, the different gases must be handled differently, according to local conditions.

Compared to the amount of air necessary to burn the gas, a very small volume of gas is used. And because of its constituents, it cannot be preheated, which would of course increase its volume and would thus make it easier to direct into the furnace.

However, to get the greatest value from natural gas in heat transfer in an open hearth, it is necessary to crack the gas and get what might be called a diffusion of carbon particles throughout the fuel-air mixer so that these diffused particles may become incandescent from the burning products of combustion and transmit a radiant heat from the fuel itself. Mr. Coughlin believed this best can be done by means of a low-velocity injection of the natural gas into the entrance part of the furnace, which is hot enough to crack the gas. Also, at this point the preheated air for combustion can pick up the fuel and carry it across the bath. Such a type of flame is more necessary of course when the bath has its blanket of slag, which really acts as a heat insulator and through which it is necessary to transmit heat to the metal.

Because of this comparatively low velocity of the air-gas mixture, it is extremely difficult to control the flame direction, which is very desirable in order to keep it away from the roof for the full passage across the hearth. Because of this control difficulty it is necessary to be extremely particular in the design of the port floors and roof so as to carry as nearly as possible a smooth flowing eddy-less or streamlined flame.

After the discussion on the use

of natural gas in metallurgical furnaces, a talk was given by Ralph H. Sweetser, blast furnace consultant, on the effect of carbon in pig iron, with particular emphasis on the idea that combined carbon is the controlling factor in iron quality.

Mr. Sweetser stated that from a review of a limited number of analyses of pig iron made in sand pig beds and graded by eye; from a study of the analyses of recent machine cast foundry iron graded by analysis and further classified by fracture; and from a recent review of the analyses of steel making iron made during extensive temperature tests he has been brought to the belief that the percentage of combined carbon in a pig iron is the one chemical analysis which can be safely used as an indicator of its present character, its past environment and its future behavior.

He continued by stating that much evidence is now available to support the theory that the deciding factor in determining whether a certain pig iron will make good open-hearth steel, is not high total carbon or very low sulphur, but it is *low combined carbon* in the pig iron. A considerable amount of actual operating data was put on the record by Mr. Sweetser in support of his theory.

Residual Metals

The usual report on residual metals in open-hearth steels was again prepared this year by John D. Sullivan of Battelle Memorial Institute. Mr. C. E. Sims of the institute, presented the data to the convention.

He stated that in this day of increasing use of alloy steels, there is a belief that some of this alloying material will soon be finding its way back into the open hearth in unwanted amounts. So far, however, Battelle has found no such indication, and an examination of the graph in Fig. 1 indicates that no dire results from alloying metals should be anticipated in the near future.

The current report for 1936 covered detailed analyses of samples taken from 21 plants with an annual capacity of approximately 8,500,000 tons. In comparing the detailed analyses for last year, it is evident that there have been no marked changes in the amount of residual metal except manganese,

which is not a true residual metal because it is intentionally added in the pig iron so as to furnish a heat with a predetermined manganese content. In the case of some individual plants, the percentage of residual metals changed, but whereas the change was upward in one plant it was downward in another. Therefore, the average changed but little.

The average of all plants by tonnage capacity for the various residual metals in 1936 were as follows: nickel, 0.042 per cent; copper, 0.103 per cent; tin, 0.013 per cent; manganese, 0.18 per cent; chromium, 0.029 per cent. A graph showing the variation in all the metals since 1929 is reproduced in Fig. 1.

Several operators in private conversation were of the opinion that these data on residual metals might not be entirely representative for the reason that too great a percentage of the data may have come from plants using a great deal of hot pig iron.

Sodium Fluoride

The consensus regarding the effect of sodium fluoride additions in molds was decidedly in favor of its use, although the beneficial results are not great. Republic reported its use for many years; M. T. Devaney, of Carnegie-Illinois Steel Corp., reported on its successful application for three years; and R. Tietig, Jr., of Andrews Steel Co. gave some detailed data on his use of the material over the past few months.

All users agreed that the proper addition of sodium fluoride to rimming steel ingots is about 2 oz. per ton for the lower carbon grades and 3 oz. per ton for the higher carbon steels. The sodium fluoride should be thrown in when 2 or 3 in. of metal has been poured in the mold to form a cushion. The action is mechanical rather than chemical, as attested by the roaring sound and the strong sodium flame discernible. In all probability all of the compound burns out of the steel.

All three men stated that when an ingot is followed through the rolling and finishing stages, it is difficult to discern any difference between steel treated or not treated with sodium fluoride. It was conceded, however, that surface appearance might show a slight improvement. Also, the ingot treated

with sodium fluoride requires somewhat less chipping.

The value of sodium fluoride comes from the violent momentary mechanical action created in the bottom of the ingot at the time when it is most needed. In low-carbon rimming steels the action is very much increased. Probably its value is more pronounced in ingots of large cross-section (30 x 64 in.), and also in those higher carbon rimming steels (0.20 to 0.25 C), that is in the range of carbon which is most difficult to rim.

Mr. Tietig stated that in low-carbon rimming steels (0.06 to

be in removing sulphur. The higher the iron oxide of the slag, the higher the oxygen content of the bath, other factors being equal.

According to Mr. Chipman a number of methods have been used in the past for describing the basicity of open hearth slag. Usually for any one given practice, it is sufficient to have the lime-silica ratio as a measure of how basic the slag is. But when various practices are to be compared, or when data from several shops are to be used in studying the effects of slag composition, it is found that the comparison is more trustworthy if

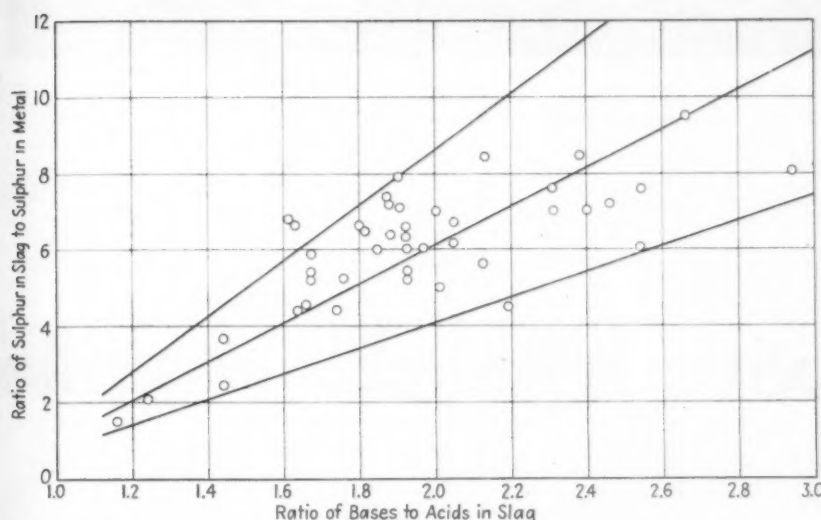


FIG. 2—These data illustrate the marked superiority of a highly basic slag as a desulphurizer.

0.08 C) the metal came up fast and then immediately dropped and kept on dropping as the metal rimmed across. Mr. DeVane stated definitely that primary blow holes were moved in from the surface, and that the holes were smaller and much cleaner when sodium fluoride was used. There was not much change in segregation, if any.

Basicity of Slag

A subject dealt with in considerable detail during the Thursday morning session was the effect of slag composition upon oxygen, carbon, and sulphur in the bath. Some comments on this general question were introduced by John Chipman of the American Rolling Mill Co.

Mr. Chipman pointed out that it is well known, of course, that carbon, oxygen, and sulphur in the bath are affected by the composition of the slag. The more basic the slag, the more effective it will

be in removing sulphur. The higher the iron oxide of the slag, the higher the oxygen content of the bath, other factors being equal.

The important basic oxides are CaO and MnO . The basic characteristics of FeO are weak in comparison with these, and most of the MgO in open-hearth slag is not really in solution but is dispersed as grains of periclase. The important acid oxides are SiO_2 and P_2O_5 . The other acid oxides, Al_2O_3 and Cr_2O_3 , are probably somewhat weaker in their acidic properties, and, on account of a complete lack of knowledge as to their chemical behavior, they are reluctantly omitted from consideration.

Mr. Chipman continued by stating that the effectiveness of the slag in removing sulphur from the bath is dependent upon many factors, such as the composition and fluidity of the slag, temperature, area of bath, and amount of action that occurs. The great importance of slag basicity is illustrated in

Fig. 2. As a measure of the desulphurizing power of the slag, the ratio of sulphur in the slag to sulphur in the metal at tap is used. In these studies both slag and metal sulphurs were determined by the evolution method. Occasional comparisons with gravimetric sulphurs show fairly good agreement. Although there is considerable scatter among individual points on the plot, Mr. Chipman's data as a whole indicated the marked superiority of the highly basic slags as desulphurizers, and the average as represented by the heavy line (see Fig. 2) may be taken as the norm on the basis of which it should be possible to study the effects of some of the other variables.

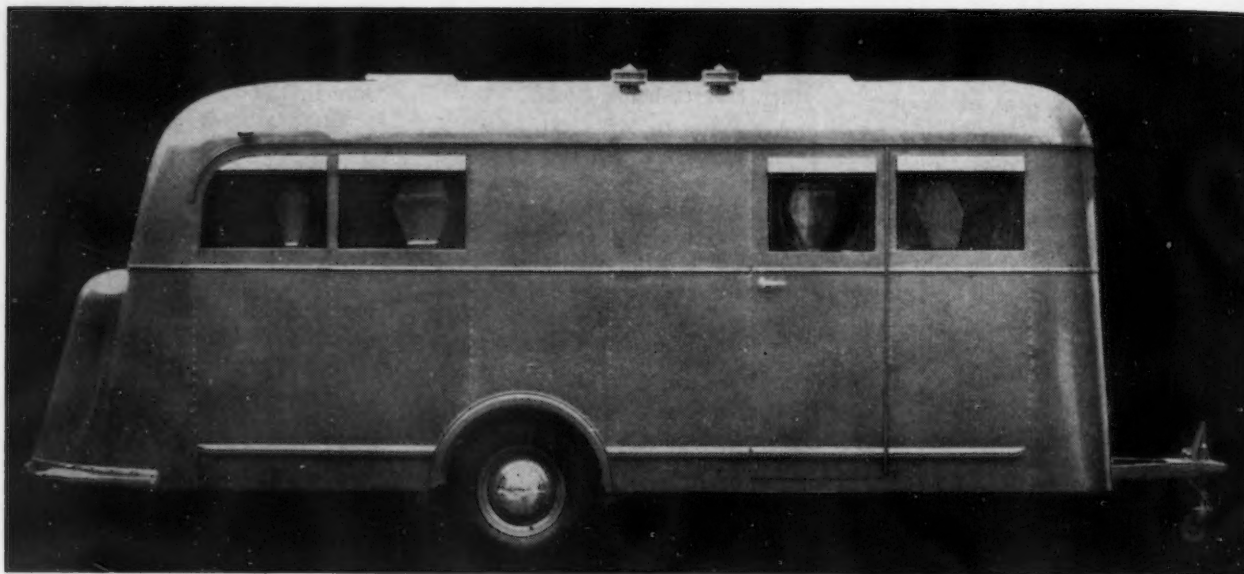
Basic Open-Hearth Iron

The session on slag basicity was followed by a long résumé of basic open-hearth iron, prepared by Paul J. McKimm, of Otis Steel Co. In Mr. McKimm's absence, his data were reviewed by W. E. Buck of Granite City Steel Co.

It was stated that one question which comes up more often than any other is that of deoxidation, i.e., whether to add spiegel, silico-spiegel, silico manganese, manganese to the bath and so on. Mr. McKimm believes this depends solely on individual plant practice, as each has its specific usefulness under certain conditions. His experience has been that when the residual manganese is normal, slag satisfactory and heat well shaped up, a box of pig iron should be added for reboil and manganese should be added in the furnace, part to the furnace with a final addition in the ladle, or all to the ladle.

A test for one year was conducted where half of all heats had a manganese addition, part to the furnace and the balance to the ladle, and the other half of all heats with total manganese requirements made to the ladle. No difference could be determined in any respect. This being true, the manganese should then be saved, according to Mr. McKimm. He stated also that special deoxidizers have their benefits mostly in steel of higher carbon and in those that are killed, but, they are not required for low carbon rimmed steel unless individual plant practice would be such that some definite benefits could be derived.

(CONTINUED ON PAGE 58)



ONE of the new models of Bender all steel trailers.

Automotive Methods Applied To



THE house trailer has adopted the production and assembly methods of the automotive industry in a trailer plant just placed in operation by the Bender Body Co., Cleveland, for the manufacture of a new line of all steel trailers designated as the Bender travel mansions. Of particular interest to the iron and steel industry is the fact that the Bender company has thrown aside the hesitancy that the trailer industry has shown towards the use of steel in the manufacture of trailer body frames and side walls. The new Bender trailer can be rightly designated as of all steel construction, as it has an all steel frame and the outer covering of the body is also entirely of steel, so that all members that give the body its strength, rigidity and durability are formed of steel members which are joined by riveting and welding. The use of wood is confined mostly to cabinets and other interior equipment.

A trailer field, heretofore apparently undeveloped and offering wide possibilities, is the construction of what is designated as commercial shells, production of which has been started in the Bender plant. The shells without any of the interior equipment required for a house trailer may be fitted for numerous uses such as carrying a salesman's stocks and samples and the demonstration of merchandise and appliances. The interiors of these may be fitted up to meet the customer's requirements. Incidentally, in addition to a transformer, which is regular equipment for converting city current to six volts for lighting, outlets are provided on the 110-volt circuit for electric appliances and a power generator is furnished with one model as special equipment which may supply current for demonstrating electrical appliances.

School busses will also be added to the Bender line of equipment. These, of all steel, will be made on

a production basis in standard models.

An objection that has been made to the all steel trailer is that it is uncomfortably hot in summer. With complete insulation and air pockets between the insulation and walls and ceiling, the Bender trailers are built for both summer and winter use, the insulation keeping out the summer heat and winter cold, the interior of the larger models being kept warm in winter by a stove burning charcoal, wood, coal, or briquettes.

A pioneer in motor coach body construction in which it has been engaged since 1919 and in the development of the all metal coach body, the Bender company on deciding to enter the trailer field acquired for its trailer factory the four-story Willys-Overland plant in Elyria that had been idle several years and in four months completely equipped it with the most modern facilities for trailer manufacturing. The plant has over

450,000 sq. ft. of floor space, being, it is claimed, by far the largest plant in the country devoted exclusively to the manufacture of trailers. With an extensive system of conveying equipment for handling parts and for assembling, the plant is laid out for economical routing and moving work in process and in final assembly. The layout for the progressive production and assembly was developed by Howard Dayton, production engineer of the company.

There are five lines of overhead tramrail aggregating 2200 ft. in length that are used in the fabrication of sub assemblies and for moving these to the point at which final assembly starts and five chain type power driven conveyors just

moving during assembling operations. Equipment is provided for a definite production schedule of 17 trailers in an 8-hr. day, which means that one trailer will leave the assembly line every 28 minutes.

The chassis rails are 11-gage sheet steel and the cross members and outriggers are of 14-gage material, all in channel sections. The chassis parts are set in jigs and are welded, the welds being made all the way round the joint to provide strength and rigidity. Spring sockets and the "hitch" are hot riveted to the chassis. The chassis then moves along its tramrail line to a point where the wood floor is laid on the chassis. Then the monorail carries it into a spray booth where the completed chassis

or uprights, cross members and other parts that form the right and left sides are assembled in jigs and arc welded. Then the steel panels, which are of 20-gage cold rolled steel, are attached, being fastened in place with quick working screws. The uprights and cross members are of 18-gage channels and angles. After attaching the panels the sides are suspended on the tramrail and carried in an upright position to jigs in which the sides are riveted to their supporting members.

In assembling the tops, the roof members, consisting of posts, roof bows and channels are arc welded in a jig and carried along the line to the next station where wood furring is put in. The next step

d To House Trailers

By F. L. PRENTISS

Cleveland Editor, THE IRON AGE

above the floors, approximately 1620 ft. long with synchronized speeds on which trailers are kept

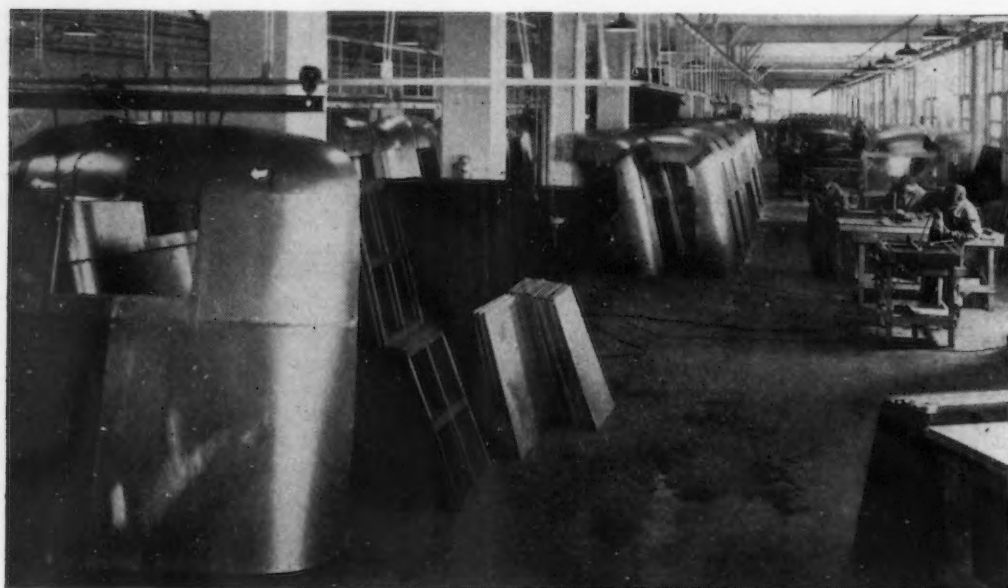
is sprayed all over with a chassis enamel.

In building the sides the posts

is putting on the deck, which is of plywood to deaden sounds and improve the radio reception. Insu-

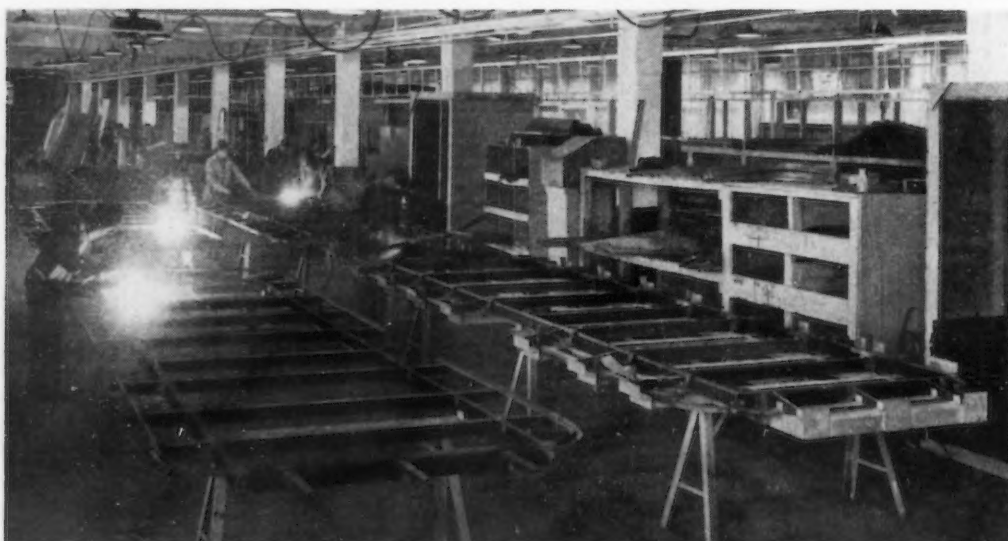
THE trailers are shown moving down one of the assembly lines for the addition of various parts.





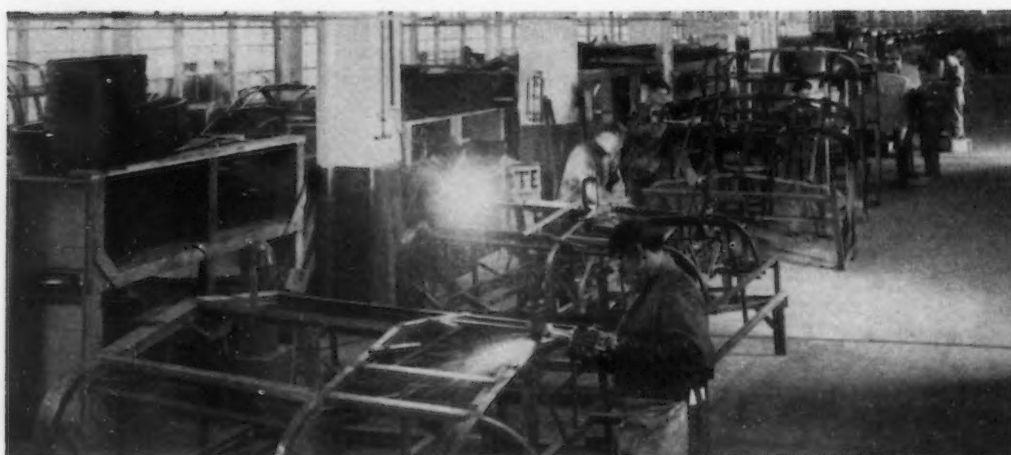
○ ○ ○
END of the front
 and back assem-
 bly lines with the
 panels in place.

○ ○ ○



○ ○ ○
BUILDING the
 chassis for trailer
 bodies. The members
 are set in jigs and
 arc welded.

○ ○ ○



○ ○ ○
ONE of the two
 production lines
 for fabricating the
 front and back
 frames. The second
 line is directly back
 of the columns.

○ ○ ○

THE start of the final assembly line. The chassis on moving a few feet from this point is picked up by the power conveyor.



THE chassis moves along the monorail line from the lower end of this room to the point in the foreground where the floors are put in and then into the spray booth where coating of chassis enamel is applied.



SECTION of the press room in which trailer parts are formed. Many of the presses had not been installed when this picture was taken. When completely equipped this department will have 35 to 40 power presses.



lation and wiring follows, after which a Masonite inside lining is applied to the top.

Fronts and backs are assembled in an adjoining building, being constructed of angles, channels and Z bars that are clamped in jigs and are welded. Moving along the monorail line to the next station the panels are welded and riveted in place. After riveting the fronts and backs are metal finished.

The various sub assemblies during their fabrication move on their

ventive and rust resisting cement for the adhesion of Sealpack waterproof insulation which is then applied. The metal window panels, drip moldings and some other parts are installed after which an aluminumlastic canvass roof deck is put in place and a roof ventilator is installed. Window regulators are then put in and the window glass is set.

The next operation is lining the interior with Masonite and steel. About 40 per cent of this surface,

are used all supplies such as screws, hinges, etc., that are required in the assembling operations.

A trim shop for making upholstery for the trailers is located on the fourth floor. In this mattresses and cushions are manufactured. The third floor is used for a mill and cabinet assembling room. The wooden cabinets, cupboards, wardrobes, etc., after assembling, are carried to the second floor on a chain power conveyor which takes



THIS picture shows girls putting insulation and wiring into the tops, which are then hung on the monorail and moved to the assembly floor.

respective tramrails towards one central point which they reach on completion. That point is at the head of the first of the line of floor conveyors for final assembling and other succeeding operations. The first of these power driven lines is the body assembly line, the next two are paint lines for the priming and finishing coats, the next the furniture assembly line and the fifth the final inspection line. As soon as the employees are properly trained for their work and regular production schedules are established, operations on the assembly conveyors will be performed while the work is moving along the lines.

The first step in assembling is placing the chassis on dollies on which they move along the conveyor. Then the sides and next the fronts and backs are taken from the tramrail and set in place and the sub assemblies are all bolted, riveted and welded together. After these are joined the roof is put on and bolted in position. As the body moves along the line metal finishers put on joint moldings and the interior is sprayed with dust pre-

including curved portions and sections under the windows, is of sheet steel. Metal finishing of the entire body inside and out follows.

Going to the paint lines after assembling the bodies are spray coated with a synthetic primer coat and move through an oven in which they are baked at 225 deg. F. Then they pass into a color spray booth in which three coats of lacquer are applied. After painting the body is moved to the furniture assembly line where the furniture, stoves and other equipment are installed. At the end of this line the body is picked up by an electric crane and the axles, springs and wheels are installed and the brakes are hooped up, after which the trailer is run onto a testing machine and tested for rattles. From this it goes to the final inspection line and while moving along this line the finish, both inside and out, is checked. On moving off this line the trailer is ready for storage and shipment.

Each production line has a store stockroom in which are stored handy to the points at which they

them through a spray booth for the priming paint coat; then through a drying oven, a sanding room, through another booth where colors are sprayed on and then through a second drying oven. Moving out of this they are masked and go to a third spray booth for the final or two-tone coatings of paint. From here they go to the opposite side of the room where hinges, catches, locks, etc., are assembled. The wooden interior equipment is then trucked to the final assembly floor.

The completeness of these new house trailers is indicated by the compactly arranged equipment that is provided for the comfort of the occupants. This includes davenport and dinette seats that open into full sized double beds with drawers beneath, a gasoline cook stove, a heating stove, 20-gal. water tank with pump, cupboards and cabinets, utility combination cabinet and wardrobe, including shower room, chemical toilet and full length mirror. A hot water tank and heater for shower baths is furnished as extra equipment.

Selecting a Motor To Fit a Drive

By FRANCIS JURASCHEK

Consulting Editor

WHEN the operating characteristics of the various types of motors are known (see *The Iron Age*, April 15, page 40) the problem of selecting the right motor for any drive is one of analyzing load elements, and starting and control requirements.



ELECTRIC motors are rated in terms of horsepower, taking into consideration both torque and speed elements. Torque is expressed in terms of pound-feet available to turn a shaft. It is not in itself a measure of work, or power or energy. In electrical practice it is used to designate the force in pounds producing rotational effect upon a shaft at a distance of one foot from the center of the shaft. A shaft-twisting effort of 10 lbs. measured at the end of an imaginary lever arm projecting 12 inches from the shaft center is equivalent to a torque of 10 lb-ft. Speed is expressed in terms of the number of revolutions per minute of the shaft.

Complete motor specifications as

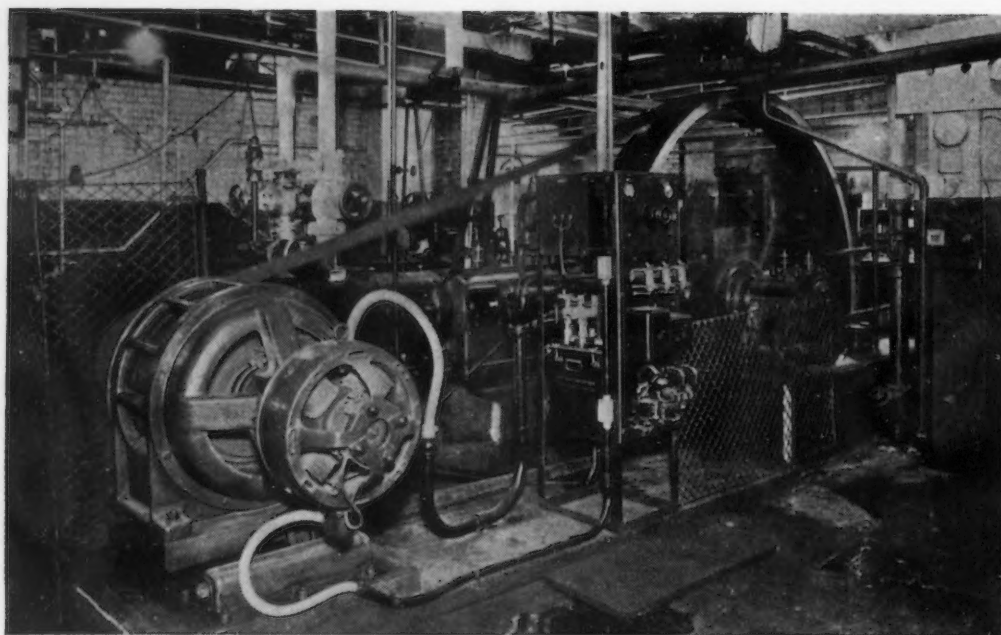
listed in most motor manufacturer's catalogues will contain three figures for each motor, under the heading "Torque in pounds at 1 foot radius"; namely, full-load torque at full speed, starting torque with full voltage, and maximum running torque. At times, however, in brief specifications, starting torque and maximum running torque will be expressed as percentages of the full-load torque, and unless the full-load torque is specifically given in pounds at 1 foot radius, it will be necessary to ascertain this from the motor manufacturer to make an adequate analysis of a drive situation.

Most motors develop their maximum running torque at from two-thirds to three-fourths of full speed. Likewise the voltage of the current supplied to the motor has a distinct influence on the actual maximum and starting torques which that motor can develop. It appears to be quite common practice to carry a voltage at the power house or substation 5 per cent to 10 per cent above the normal voltage for which the motors are rated, to insure that the drop may not be too far below normal for effective use on motors far removed from the plant source of power. This has the effect of boosting maximum

and starting torques of the first motors on the line approximately in proportion to the square of the percentage the voltage may be increased above normal, with figures correspondingly less for voltage below normal. These conditions are frequently adjusted, however, by the installation of transformers, or by laying out the current distribution system in the plant to secure approximately normal voltages at each motor.

Sometimes the frequency of alternating current will vary (as 57 or 63 cycles per second instead of 60). Motor speeds are directly affected by such variation; that is, motor speeds will be less or more than rating by the same percentages that frequencies vary under or above normal.

Since the horsepower ratings of motors are based on full load torque at full speed, all such variations in torque and speed will affect the actual horsepower delivered by the motor. All standard general purpose motors (except fractional horsepower sizes) are built today with a service factor of 15 per cent permissible overload. This is indicated on many motor nameplates by the standardized phrase adopted by the National Electric Manufacturers Association, "Service factor



GENERAL ELEC-
TRIC synchro-
nous 100 hp. motor
belted to reciprocating
air compressor.
At unity power fac-
tor, the operation of
this motor improves
the power factor of
the entire plant.

1.15 at rated volts and cycles." This service factor is a multiplier which, applied to the normal horsepower rating, indicates the permissible loading within the accepted safe limits of temperature rise for the insulation used in the motor. (All guarantees of efficiency, power factor, etc., however, are based on the normal rating of the motor, and do not apply at the rating obtained by using the service factor.) For example, for a maximum load of 55 hp., a 50 hp. motor may be used, since 50×1.15 , or 57.4 horsepower is indicated as the permissible loading; provided the starting and maximum torques of the 50 hp. motor are sufficient, and the voltage and frequency are maintained.

Determination of Motor Size

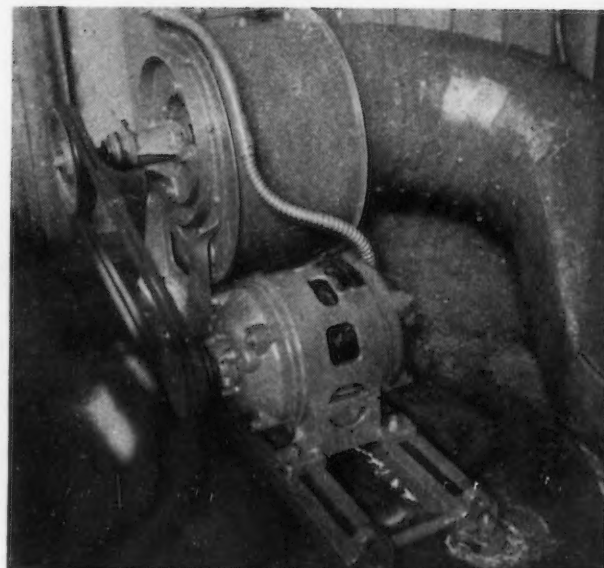
The power demand of a machine or drive is the ordinary measure of the size of motor required. For any machine or drive which requires a definite torque, more power is needed to drive it at high speed than at low. In determining the power demand it is necessary to consider the normal speed of operation, and also the starting torque and maximum torque demands.

An analysis of the elements of any load on a drive shows that three factors enter the problem:

The work done by the driven machine or machines in performing a useful function (useful work).

The work done in overcoming friction in the motor, in the drive, and in the machine or machines driven (friction load).

CROCKER-
WHEELER
2-speed squirrel
cage motor driving
a small ventilating
fan. At
various seasons
greater or less fan
capacity is gained
by the simple
shifting from high
to low motor
speed, or vice
versa.



The energy imparted in accelerating and consumed in retarding the moving parts of the motor, the drive and the machine or machines driven (inertia load).

According to Gordon Fox, "The relative importance of these three items differs in different applications. In a crane hoist, for instance, the useful work is the greater part of the load. In the case of a printing press, the load is largely due to machine friction. In the case of a mill-table or screwdown in a steel mill (devices which are rapidly started, stopped and reversed) inertia of the machine and motor is a predominant factor. In any drive the presence and relative importance of all of these elements of load should be considered."

Useful Work. Calculation of the useful work performed by a machine may often be reduced to a problem in mechanics such as the lifting of a weight a given distance, pushing a definite stroke against a known or calculated opposing force, shearing or removing metal, pumping water, or blowing air. When no simple means of calculation are available, actual tests should be made, or comparisons made with other known operations.

Friction Load. Although it is possible to calculate approximately the friction load of most machines or drives, it is easier and preferable to ascertain it by actual test, or sometimes by comparison with other similar machines or drives upon which the data are available.

In any event, the friction load may vary according to the condition of the bearings, gears, alinement and lubrication. For all practical purposes the friction load of any machine or drive may be assumed to be the same at any speed of operation, as the actual variation due to speed is infinitely small as compared with any other variable entering into the problem.

Inertia Load. The measure of the inertia which must be overcome in accelerating or retarding the

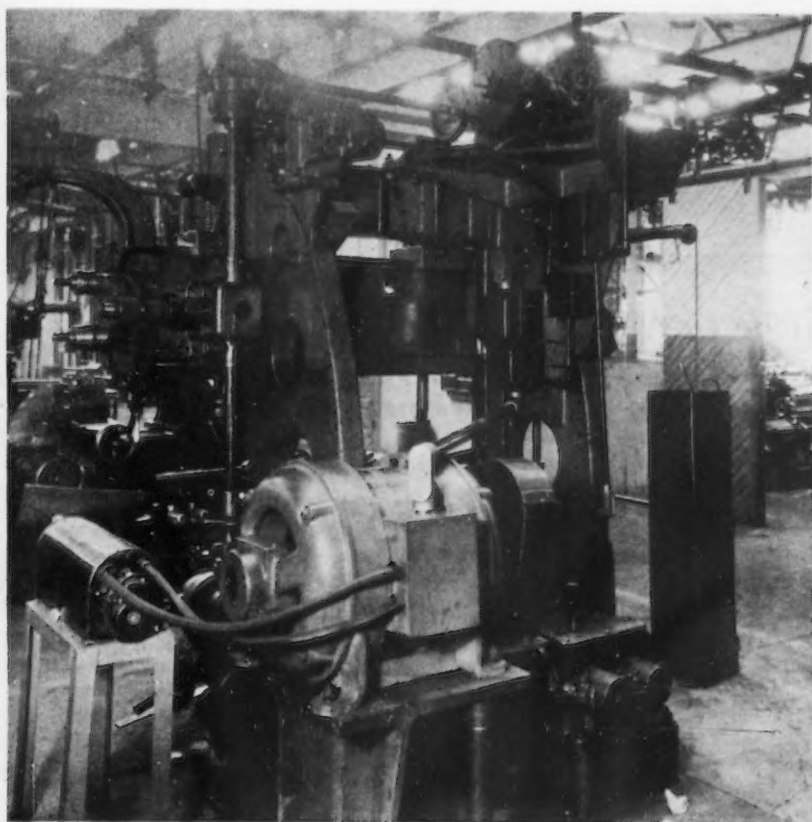
motor and the machinery may likewise be calculated, but is more often determined by test or comparison with known data. When determined by test it is usually done by noting the time required for a machine to drift to rest, retarded by its friction load, and substituting this time in a formula which, when solved, gives the inertia at the shaft in terms of pound-feet of torque.

To quote Gordon Fox again, "Inertia load involves change of kinetic

energy. It depends upon change of speed. It exists only in those portions of the operating cycle during which the speed changes. It is then present in amount depending upon change of speed. Rapid acceleration or retardation involves rapid change of kinetic energy, and a heavy inertia load. It is thus evident that the inertia load of a machine is not a definite value, but a variable depending upon the rate of change of speed."

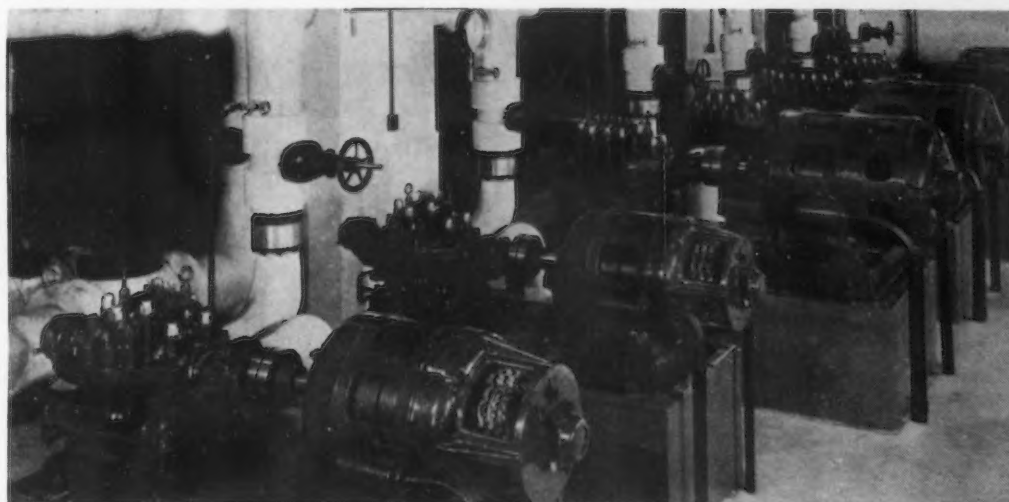
Load Characteristics

Steady and continuous loads on a driven machine give a direct measurement of the motor capacity required to drive it. But most machines have fluctuating loads; some occurring in a regular cyclic manner as in a metal planer, where cutting, return stroke and reversing impose differing power demands in orderly sequence; some occurring in irregular manner as in a rock-crusher. On continuous-running drives excessive torque fluctuation may require a flywheel to equalize the power demands. Often machines or material adjustments will increase power demands, as increasing the saw tension on a band saw, or permitting a brick augur to rest long enough for the clay to set. A change in the materials handled may impose heavier loads, or one operation of a number, as on a turret lathe, may be more difficult than the others. All these conditions develop peak loads, which the motor must be gaged to handle as well as normal running loads. In the same manner, the static torque which must be overcome in starting may be very high, running from friction and inertia



LINCOLN ELECTRIC supplied the 4-speed wound rotor induction motor for this boring mill drive. Constant running speed with constant torque, at any one of the four speeds available, fulfills the drive requirements.

• • •
CROCKER-WHEELER wound rotor motors driving positive displacement pumps at high pressures. Full load starting, constant speed, constant torque on continuous, heavy duty.
• • •



loads only, where the motor is started and brought to speed without doing any useful work, to a combination of friction, inertia and useful work loads all together.

Because of the wide variety of requirements of driven machines, the starting or peak load duties, rather than the normal running duty, may be the decisive factor in determining motor size. The amount of pull actually required to start the load may usually be measured directly, likewise the peak load may be determined similarly, although not so easily. Standard general purpose motors are designed to carry reasonably fluctuating loads both above and below normal rating, and equivalent average loads will usually suffice to determine the size of motor needed. The frequency of starting and the

duration of the starting period, as well as any unusual starting current limitations have an important bearing on the type of motor to be used, and although for most cases a generalization of starting conditions as light, medium, heavy or extremely heavy can be made, all unusual conditions should be considered as justification for the selection of a motor and control especially adapted for the job.

Changes in load may be caused by changes in speed, and this must be considered, particularly in determining the sizes of adjustable speed and multispeed motors. A printing press load, as has been said, is largely friction, and while the torque remains practically constant at all speeds the horsepower demand increases almost in direct proportion as the speed increases.

In such a constant torque drive the motor exerts its maximum power at its maximum speed. In a rolling mill, on the other hand, the horsepower demand may be almost the same at all speeds, for heavy sections will be rolled at low speeds, and lighter sections at higher speeds. As a third variation, the centrifugal fan drive may be cited, where the load is light at low speeds, but increases almost as the cube of the increase in speed.

It is to meet these varying requirements as closely as practicable that we have so many different types of motors commercially available. In selecting a particular motor for a particular drive the objective should be to secure a motor which will meet every demand of the load fairly, yet without the excessive cost required by

Guide to Motor Selection

A detailed study of load conditions may show the desirability of using another type of motor than here indicated. In general, however, this table will cover the more usual conditions of motor selection and application.

| LOAD CONDITIONS | REQUIRED MOTOR CHARACTERISTICS | TYPE OF MOTOR | TYPES OF MACHINE DRIVES |
|---|---|---|--|
| Constant speed, continuous duty, infrequent load fluctuations. | Normal torque, normal or low starting current. | A.C. squirrel cage, general purpose. D.C. shunt wound, constant speed. | Pumps (centrifugal, rotary or turbine), fans (centrifugal or propeller), positive pressure blowers, lineshafts (short and medium), motor-generator sets, metal grinders, shapers, screw machines, planers, lathes, milling machines, keyseaters, buffers, drillpresses, circular saws (small and medium), joiners, molders, sanders, cotton gins, spinning and weaving machinery, jords, pulp grinders, job printing presses, brine agitators, laundry washers, drawing rolls, pipe-threaders, small stokers, etc. |
| Constant speed, heavy starting, continuous or intermittent duty. | High torque, low starting current. | A.C. squirrel cage, low slip. D.C. shunt wound, constant speed. | Pumps (reciprocating or displacement), compressors (air or refrigerating), belt conveyors, stokers (medium and large), crushers without flywheels, dough-mixers, grinders, hammer mills, ball mills, pulverizers, turntables, car-pullers, large band saws, pug mills, drying pans, brick-presses, brick and tile machines, gear plungers, tumbling barrels, centrifugal sand mixers, bucket elevators, drawing rolls, bending and straightening rolls, grain elevator legs, etc. |
| Constant speed, light starting, high continuous duty. | Low starting torque, low starting current. | A.C. squirrel cage, low slip. D.C. shunt wound, constant speed. | Larger sizes of pumps (centrifugal and turbine), blowers and fans (centrifugal and propeller), motor generator sets, etc. |
| Constant speed, high continuous duty. | Power factor correction. | A.C. synchronous. | Compressors (air and refrigerating), steel-mill roughing stands, wood-chippers, tube expanders, etc. |
| Constant speed, periodical load fluctuations smoothed by flywheel effect. | High torque, low starting current, high slip. | A.C. squirrel cage, high slip. D.C. compound wound. | Punch presses, shears, power hammers, crushers, bending rolls, laundry extractors, turning mills, large propeller fans, printing presses, paper cutters, hoisting and conveying machinery, elevators, etc. |
| Single speed reversing service, full load starting, intermittent duty. | High starting torque, high slip. | A.C. double squirrel cage. D.C. series wound. | Cranes, hoists, lifts, elevators, conveyors, vacuum drum dryers, valves, turntables, drawbridges, railway trucks, certain flywheel applications, etc. |
| Multi-speed, full load starting, constant speeds, continuous duty. | Variable torque, constant torque, or constant horsepower. | A.C. slip ring (wound rotor). D.C. series wound. | Pumps (centrifugal, turbine or displacement), centrifugal fans and blowers, long lines of shafting, heavily loaded conveyors, winches, cranes and hoists, boring mills, turret lathes, wood surfacers, wire drawing machines, newsprint roll drives, scale breakers, stone dryers, rock crushers, etc. |
| Adjustable speed, heavy duty, loads fluctuating. | High torque, high starting current. | A.C. slip ring (wound rotor). D.C. shunt wound, adjust, speed. | Cement kilns, ore grinders, mill tables, cold strip mill rolls, boring mills, roll grinders, finishing stands, paper winders, etc. |

a specially designed and constructed motor, or one of excessive rating. To fit a commercial motor to most drives requires, therefore a certain amount of compromise between the operating conditions encountered and the motor operating characteristics available. Yet so large is the range of commercial motors now on the market that such compromises, where necessary, need not be difficult.

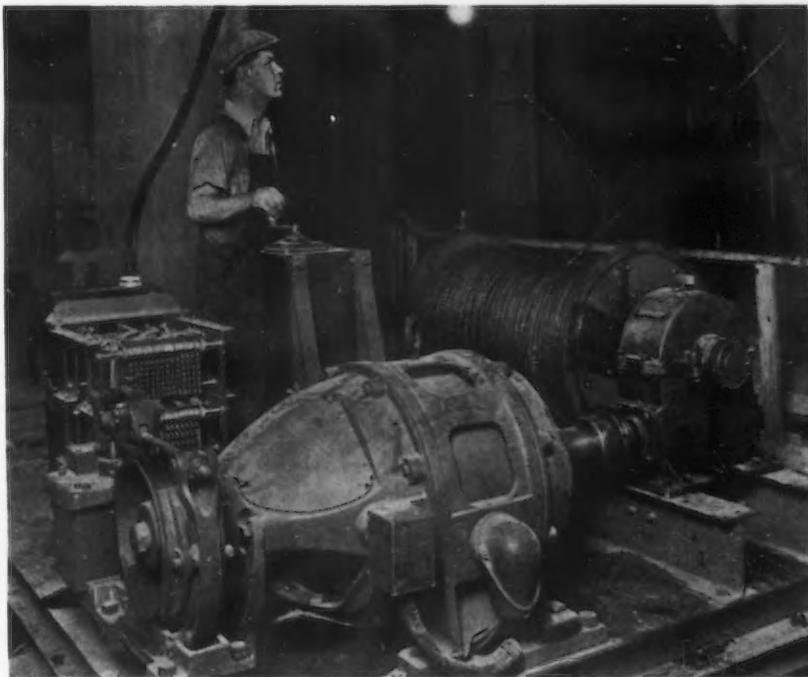
The main points to bear in mind in the selection of a motor for a drive subject to fluctuating load are:

1. The normal load conditions, and the extent of the deviations therefrom.
2. The maximum load requirement and the duration of its demand.
3. The average load, calculated from a summation of momentary demands.
4. The differences in motor ratings for open and enclosed types, as well as for fairly continuous duty at approximately full load and for intermittent service.

For all motors, whether subject to constant load or fluctuating load service, the speed requirements of the drive should be given careful consideration. Most machines operate more or less continuously at fairly constant speed. Some, as textile machines and paper-making machines require a high degree of speed accuracy; other require adjustable speeds, that is, several different speeds each at a constantly maintained value. For direct connection, the machine requirements will usually dictate the speed of the motor; for gear, chain or belt drive a choice is available. Within limitations of motor performance and mechanical practice, it is usually advisable to use as high a motor speed as possible, since thereby the first cost of the motor is lessened. And, both the power factor and the efficiency of induction motors are best at higher speeds.

Motor Efficiency

Where a possible choice exists between two or more types of motors, that motor which is efficient under the particular drive conditions encountered may save a worthwhile margin in power consumption, although load factor has an influence here. A lightly loaded and seldom used motor, even though highly efficient, gives rise to a situation where the power saving may be

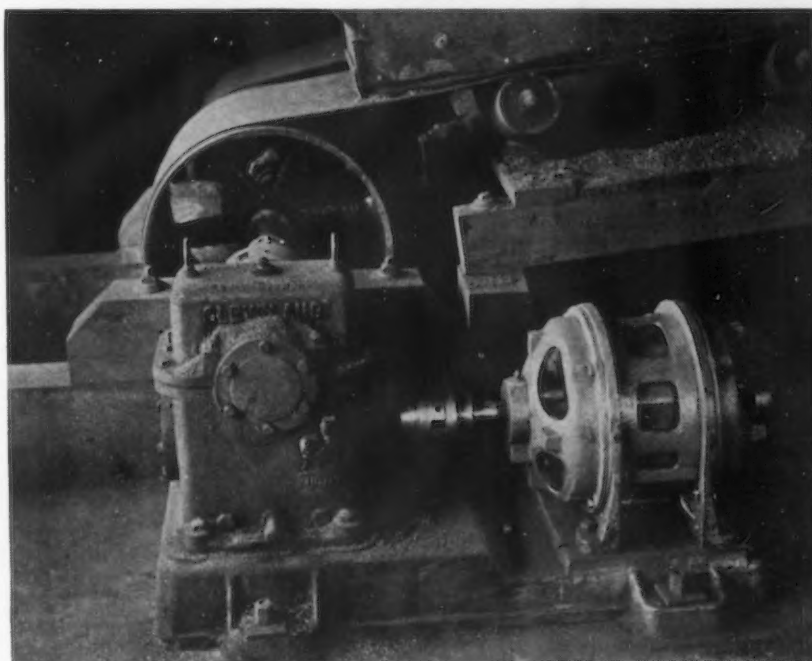


A WESTINGHOUSE 50 hp. wound rotor induction motor powers this winch. Full load starting, adjustable speed, heavy intermittent duty and high constant torque are the motor characteristics desired in such a drive.

negligible as compared with the case of a motor driving steadily and well loaded. In any event, the margin in added first cost of a high efficiency motor as compared with a general purpose motor should be balanced against the power savings possible, to determine the justification for spending the extra money. As noted above, the higher speed

alternating current motors (particularly of the induction type) are more efficient than the lower speed motors. Likewise, their first cost may be less. In d. c. motors, the moderate speed types show slight efficiency advantages over both low speed and high speed machines.

The efficiency of a motor is usually best at about full load, conse-



WESTINGHOUSE double squirrel cage motor driving a coal conveyor through a reduction gear. High starting torque, full load starting, and high slip are the motor characteristics needed here.

quently it is always advisable to operate it at sufficient load to realize good economy. To use a motor of very much larger rating than the load really demands is to incur two penalties: fixed charges on excess motor investment, and operating charges on excess power consumption.

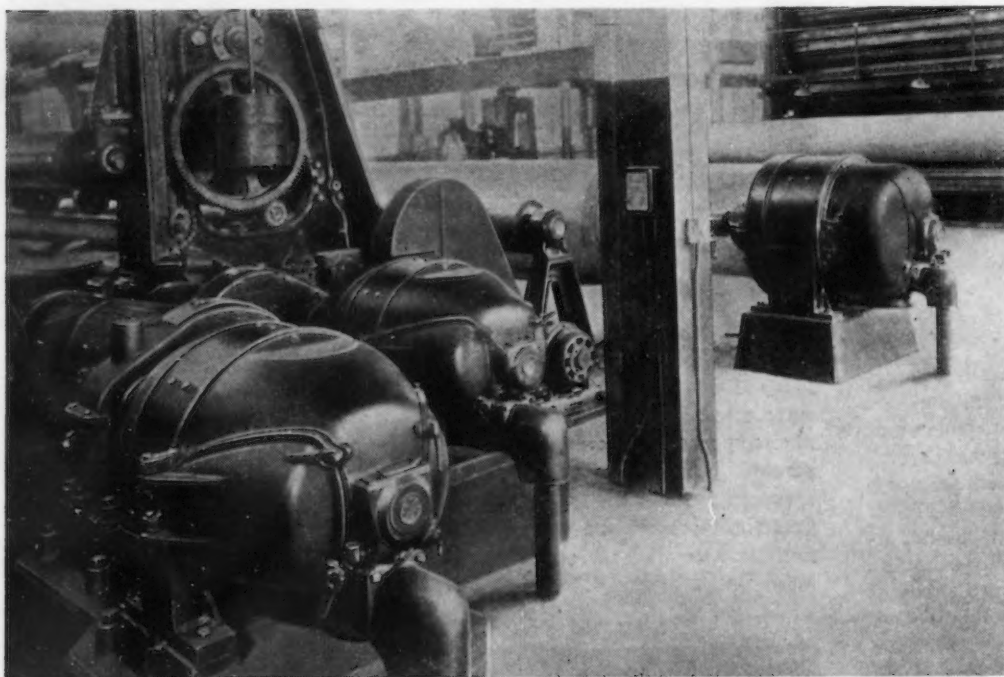
A consideration of motor efficiency leads directly to the allied subject of power factor. All alternating current motors use electric current in two ways; for magnetization purposes and for direct power-producing purposes.

power factor operation in detail. From it this brief summary may be abstracted:

In an induction motor the reactive current which magnetizes the working fields cannot be measured by a watt-meter, for it does not produce energy. Nevertheless, such wattless current must be furnished by generator capacity in order to permit the active current (which does real work and may be measured by a watt-meter) to function in the motor. The total current furnished the motor, therefore, is greater than the working

ing small motors with marginal load capacity and usually under-loaded, demanding in combination a large magnetizing current; or where slow-speed induction motors are used. Where there is little or no load of inherently high power factor to be combined with such low power factor loads to bring the average up for the plant, one or more of these four things should be done to raise the overall power factor:

1. The whole drive situation should be carefully reviewed, to determine the most effective applica-



GENERAL ELECTRIC d.c. motors, with adjustable-generator - voltage and regenerative braking tension control, on 2-drum paper winder in a kraft paper mill. As the paper winds on the roll, the tension must be exactly regulated to the diameter of the roll to prevent breakage of the paper.

The two functions are inseparable, of course, for rotational effect cannot be produced unless the motor poles are magnetized. But it takes a certain amount of current to effect such magnetization, and that current cannot also be used to produce rotational effect. Practically, the amount of current required for magnetization is constant whether the speed be high or low, and whether the load be light or heavy. But the power-producing current varies as the load and speed. Consequently the ratio of the magnetizing current used to the power producing current used varies with the load and speed; being high at low loads and for low speed motors, and low for full loads and for high speed motors. An article on this subject by the present writer, published in *THE IRON AGE* of Oct. 12, 1933, treated of the evils of low

current, and may be determined by multiplying together the readings of an ammeter and a voltmeter inserted in the motor feed line. The resultant is expressed in kilovolt-amperes; the working current, measured by a watt-meter, being expressed in kilowatts. The ratio of kilowatts to kilovolt-amperes is the power factor. In other words, power factor is the ratio of actual power-producing current used to the total power drawn by the motor.

The induction motor is the principal low power factor offender. Its simplicity, reliability, low cost and suitability to most drive conditions lead to its widespread use. But such widespread use frequently produces a condition of uneconomic power use, especially where many individual motor drives are used in a plant, involv-

tions of the total power required.

2. Capacitors, or banks of stationary condensers, should be used.

3. One or more drives should be changed over to synchronous motor operation, or a synchronous motor added to the line to act as a rotary condenser.

4. As many of the machines as possible should be combined into group drives.

As illustrating what may be done along the first line mentioned, the case may be cited of the conditions encountered in the Plymouth Motor Car Co. a few years ago. A careful study of 704 motors used in the miscellaneous small parts, crankshaft and axle departments showed that many were oversizes for the jobs on which they were being used. As a result, motors were

(CONCLUDED ON PAGE 81)

Fundamental Principles of Metallic Corrosion

By U. R. EVANS

University of Cambridge, England

THE author herein completes the discussion on metallic corrosion which was begun last week. Subjects discussed in the April 15 issue were the theories of metallic corrosion, surface emf., the inhibitive action of paint pigments, etc. This week's review concerns itself with the functions of metallic and phosphate coatings, sprayed metals, etc.

A rather obvious way of protecting iron or steel is to cover it with a more resistant metal. Such a metal will, however, usually be cathodic to steel, and if the covering metal is soft and becomes scratched away locally, or if it is porous, exposing the steel, electrochemical action will be set up in which the steel will be anodic and suffer attack. Occasionally this attack will be locally more intense than if the whole steel had remained uncoated, but it is a mistake to suppose that this intensi-

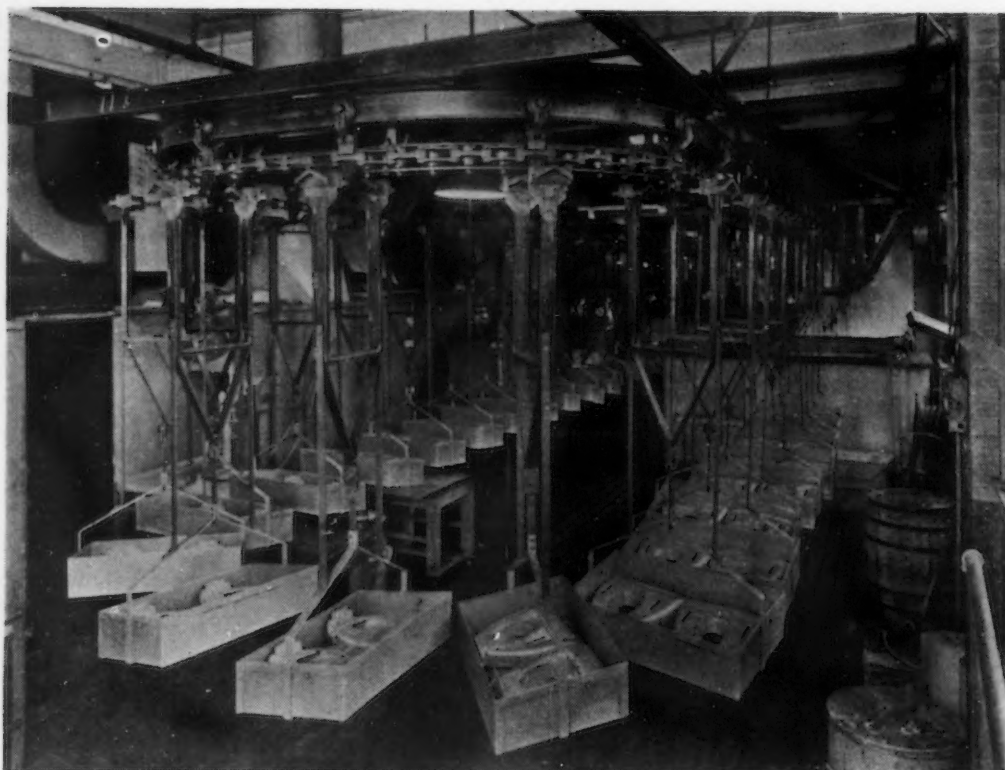
fication is inevitable or even usual. If it were true that intensified corrosion inevitably sets in at a break in a cathodic coat, then clearly nickel plating would be either perfect or worse than useless, which is contrary to practical experience. Nevertheless if a cathodic coat is to be satisfactory, it must be sensibly free from pores and fissures, and the scientific work upon the ultimate cause of defects in plating carried out in recent years is a matter for encouragement.

A coating of metal anodic to steel will in most cases give protection even if the steel basis is exposed, provided that the pore or crack is sufficiently small; the rule being that the covering metal must suffer anodic corrosion sufficiently quickly to produce the protective current density on the steel exposed. As to whether this occurs depends not only on the nature of the metal, but also on the liquid or moisture wetting the surface. Thus, for a crevice of given size, aluminium may protect steel against salt water but not against hard water, which fails to produce sufficient attack on the aluminium to

generate the protective current on the steel. A zinc coating will protect against both liquids, being attacked more quickly; in the salt water it is attacked with unnecessary rapidity and will not last so long as the aluminium coat, which also affords protection. Thus it may be best to use zinc in hard water and aluminium in salt water, unless cracks and pores can be entirely avoided, when aluminium will serve well in both cases.

It is evident that the time of immunity from rusting will depend on the thickness of these coats. A zinc coating, for instance, is attacked by the weather whether it is porous or not, although if the iron basis is exposed, so that the steel is given cathodic protection, the anodic attack on the zinc will probably somewhat increase the rate of corrosion. In either case, the life of the coating increases with the thickness of the coat, as shown in extensive tests in America.

Some special observations made at Cambridge are of interest in showing that aluminium coatings
(CONTINUED ON PAGE 58)



o o o

MAGNESIUM die castings on being delivered from the foundry to the finishing department are carried in baskets by a monorail conveyor through the pickling and rinsing tanks prior to finishing. Spray booths are located to the left of the conveyor.

o o o

Changing Finishing Operations



MAGNESIUM alloy die castings are now used in the manufacture of electric cleaners for the home by the Hoover Co., North Canton, Ohio, the change from aluminum to magnesium alloy castings being one of the most conspicuous changes that has occurred in a long time in the substitution of metals in the manufacture of household appliances. The change was made solely to reduce the weight of the cleaner, as magnesium is one-third lighter than aluminum.

While the use of magnesium alloy die castings has grown rather rapidly during the past few years, the adoption of this metal in the manufacture of cleaners on a large production basis means the production of magnesium alloy castings on a much larger scale than heretofore. Also in connection with this development it is of interest to note that the part that serves as the main member of the cleaner

and is rather intricate in form is said to be the largest magnesium alloy casting to be made commercially on a production basis up to the present time.

Substitution of magnesium for aluminum castings required the expenditure of approximately \$500,000 in plant extensions and new foundry and other equipment. Manufacturing processes had to be materially revamped and new production technique developed. One of the most important plant changes required because of the adoption of magnesium was the installation of an extensive metal-finishing department. As aluminum castings are finished by polishing and burnishing, a manufacturer of electric cleaners made of aluminum does not require a very extensive coating plant. However, as the parts made of magnesium require coating, the department in which this work is done necessarily takes on additional importance because of the capacity

required and the necessity of producing work of high quality both in appearance and in the durability of the product.

The newly equipped finishing department is provided with cleaning tanks, spray booths, a baking oven and conveyors with a capacity for enameling and baking complete sets of parts for 100 cleaners an hour, with a 24-hr. day operation.

Pioneering in the manufacture and use of magnesium alloy castings for electric cleaners necessitated experimental work over a long period which was conducted by Hoover company engineers in cooperation with the engineering department of the Dow Chemical Co., whose metal, Dowmetal, is used for the castings. The finishing material was also given extensive study, the company working with engineers of the Sherwin-Williams Co., who developed the special finish that is used. This was developed both for attractive-

ness in appearance and for good wearing qualities.

The finish is a synthetic wrinkle type finish which is designated by the Hoover company as a ripple finish. While this finish has a texture that is generally similar to the common wrinkle finishes, it was developed to secure uniformity in the appearance of the ripple coating and also to provide a finish that is tough, abrasion-resistant and chip proof—non-marring qualities that are more important in the coating of a cleaner than in a stationary piece of equipment such as a typewriter or adding machine. The new ripple finish requires a higher baking temperature and longer bake than the ordinary wrinkle finish, but otherwise its application is similar.

Design as well as finish was given much attention in developing the electric cleaner. Built along attractive modernistic lines, it was designed by Henry Dreyfuss, prominent industrial stylist.

wide, 13 in. long and 4½ in. deep over-all, the handle bail, bottom plate, cleaner, chassis and motor fan. Various small steel parts as well as the magnesium parts are given the ripple finish. The cleaners are finished in stratosphere gray.

After the magnesium parts are cast the gates are sawed off and the flash is removed with polishing wheels. Otherwise no mechanical surface cleaning is required. Castings are then washed to remove surface dirt. After inspection in the foundry they are loaded in boxes which a conveyor carries to the finishing department.

On reaching the finishing department the castings are pickled in a solution containing nitric acid and sodium dichromate. This is designated as a chrome pickle treatment which is necessary prior to enameling. Without this treatment the enamel would not properly adhere to the metal. The pickling solution is said to remove 0.001 to 0.002 in.

enamel, but it tends to protect the castings from corrosion.

The pieces are handled through the pickling operation in sheet aluminum baskets carried on a monorail conveyor. Each basket is carried in a rack that has a long arm to allow the basket to be dipped down into the pickling tank.

The first tank contains the pickling solution and the other two are for rinsing, the work first being given a cold water and then a hot water rinse. The pickling tank is of aluminum and the rinse tanks are of steel. The baskets of work are dipped automatically into the tanks as the conveyor chain moves along and the speed of the conveyor is so timed that the castings remain in the pickling solution 30 sec.

In addition to having perforated bottoms, the conveyor baskets are so constructed with the bottoms set at an angle that the pickling solution will quickly drip from the baskets. Agitators in the pickling

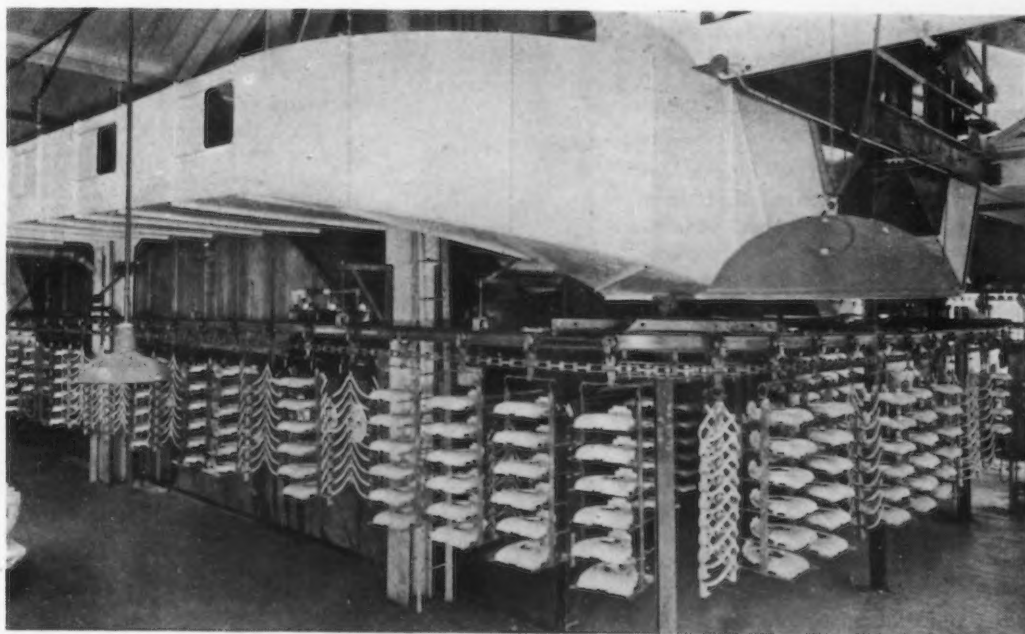
on Vacuum Cleaner Parts . . .

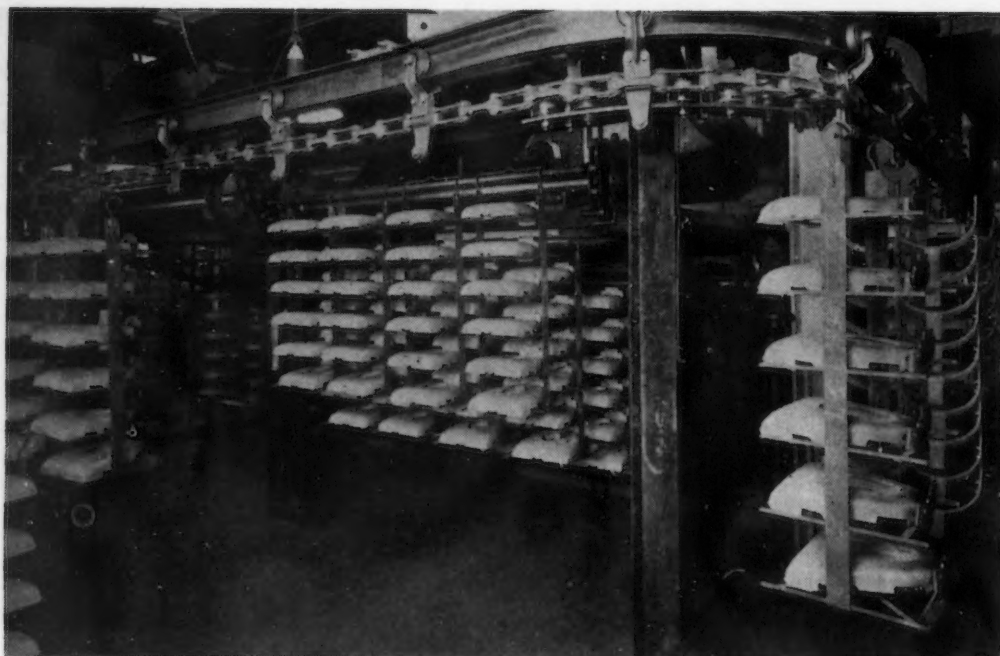
The principal parts made of magnesium are the main casting, of irregular contour and thin section, which is approximately 12 in.

of surface from the castings and gives them a yellowish film. Not only does the pickling assure a good bond between the metal and

and rinsing tanks keep the contents in constant motion. Water in the hot rinsing tank is kept at the boiling point so that the work will

THE endless chain conveyor serves the oven and makes a complete circuit around it. It also carries work through the ripple finish compartment. This shows how the castings are carried in racks suspended from the conveyor. Above appears a section of the air replacement system.





END view of the two lengthwise baking compartments. On the right side castings with the first coat are being delivered into one section of the oven and on the left side are shown the finished ripple castings coming from the finished bake section of the oven.

dry much quicker than if given a final cold water rinse.

To dry the castings thoroughly after pickling and rinsing and prepare them for the first coating they are baked for 2 hr. at 450 deg. F. During the baking at this temperature any moisture that has soaked into the metal is driven out and any oil that may have remained on the surface after cleaning is removed so that the castings are perfectly dry and clean.

Work is sprayed in 12 DeVilbiss spray booths arranged in a straight line along one side of the baking oven. Along the opposite side of these spray booths is the return line of the conveyor that serves the pickling tanks. The oven is on the other side of the booths and between the booths and the oven is an endless chain monorail conveyor that serves the spray booths and oven.

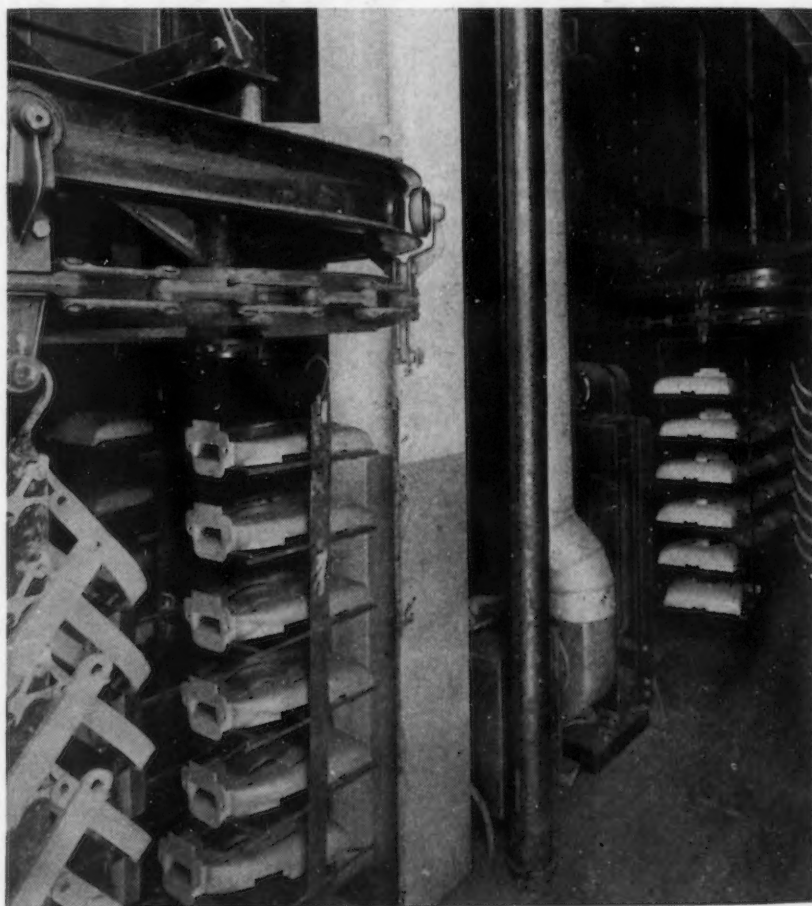
The oven has two lengthwise baking compartments that are charged at opposite ends. It also has a transverse baking compartment for the ripple finish that is located near the center of the oven beneath the lengthwise compartments. The endless chain monorail conveyor makes a complete circuit around the oven and also through the ripple baking compartment. It enters the side of this compartment, loops back and forth several times and finally comes out on the same side and continues its course around the oven.

After the castings are oven

dried, following cleaning, they are given the first spray coat and then hung on racks. The loaded racks are suspended on the monorail con-

veyor, which carries them through the ripple baking compartment where they are baked 35 min. at 200 deg. F. After the first baking

THE conveyor that makes a circuit around the oven also loops back and forth several times through the transverse ripple compartment. On the right the conveyor is shown carrying parts into the ripple compartment and at the left is shown work coming from the ripple oven. An air seal is used to keep the heat within the oven.



of the main casting, the outlet end is masked and dark gray is sprayed on the outlet. Then the pieces go back through the oven and are baked one hr. at 300 deg. Inspection for imperfection follows.

The castings then return to the spray booths for the ripple coating. The portion of the main casting that has been given a dark gray coating and is not to be rippled is masked and the finish is applied to the remainder of the surface. Then the castings are hung

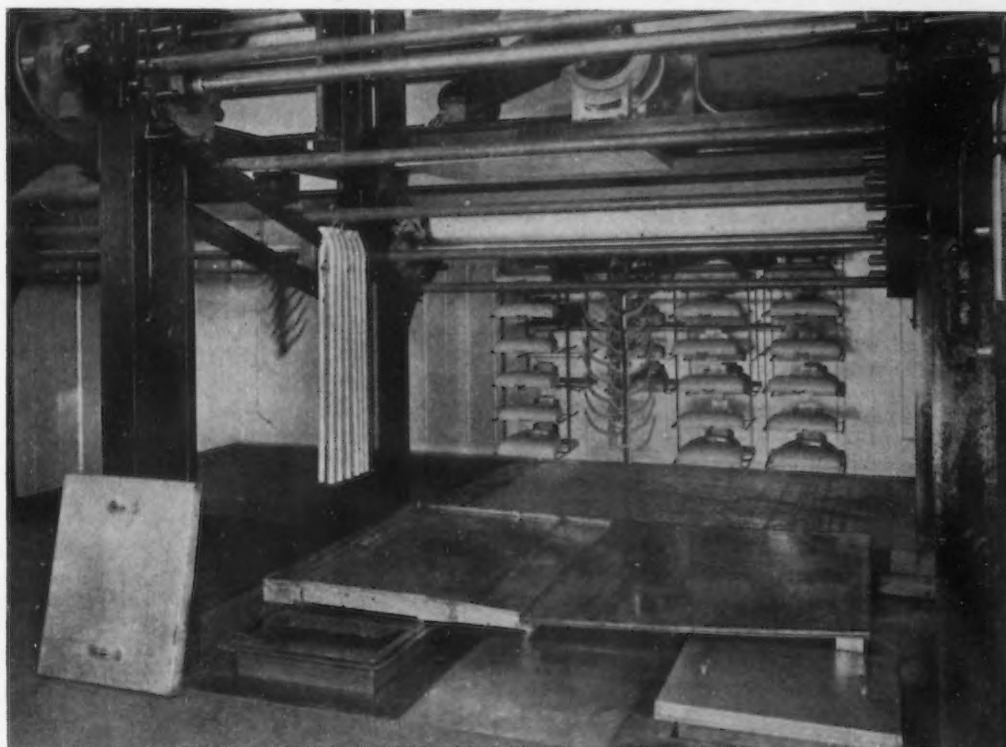
Castings are carried on the endless chain conveyor that serves the spray booths and oven on specially designed racks of various shapes that are hooked to the conveyor chain.

The baking oven is 42 ft. long and 20 ft. wide. Castings are carried through the two longitudinal compartments of the oven on cross bar conveyors on which they are hung on the same racks on which they are carried on the monorail conveyor. Both the cross bar con-

oven is air-sealed and while the castings are moving from the exit door to the end of the conveyor they become sufficiently cooled to permit them to be lifted off by hand for inspection. Over the two ends of the oven at the discharge points are Benjamin Skylight lighting units that provide daylight illumination for inspection.

Handles are made of duralumin tubing and are given two coats of finish and carried through the baking oven on racks, eight or more

IN front of the lengthwise oven compartments are dip tanks for dipping handles and other small parts. The open tank at the left contains gray enamel and the tank at the right contains black enamel. A pair of drip pans is used. The left hand drip pan shown in the picture drains the drippings back into the tank. A similar pan is used for the opposite tank. Suspended from the conveyor is a rack of handles ready to be dipped.



back on the conveyor and are carried through the ripple compartment in which they are baked 35 min. at 200 deg. F. When they leave the oven they have the rippled coating.

The work is then inspected for ripple effect and imperfections in the coatings. If there are imperfections they are corrected by the use of hand rollers and semi-circular tools having the ripple finish etched in their surfaces. As the coatings are still in a green condition, it is possible to make corrections in the ripple effect with these small tools.

After inspection of the ripple surface and of the remainder of the coating for proper finish the casting is hung back on the conveyor and given a final bake of 2 hr. at 290 deg. F.

veyors and the rack hooks on the monorail conveyor are on 24-in. centers. Operation of the oven is very flexible in that the speed may be adjusted between a baking time of 20 min. to 4½ hr. and with a temperature range of 150 to 550 deg. F. Baking time and temperature have been standardized for various colors and parts.

At the entrance to the two longitudinal oven compartments are two dip tanks for dipping handles and small parts. An agitating system is provided in these tanks. Drip pans drain the surplus enamel back into the tanks, and a distance of several feet between the end of the conveyor and the entrance to the oven provides additional space for the dripping of dipped work and allows time for the cooling of pieces at the discharge end. The

being suspended from each rack. Supplemental to the main spray booths are four spray booths in another part of the room for spraying small miscellaneous parts.

The oven, built by the Paul Maehler Co., is gas-fired by three heating units and is provided with a Micromax temperature recorder and potentiometer system for the close control of temperature. There are six thermocouples in each large compartment; four in the wrinkle compartment, and in addition one for controlling each oven burner, making 19 thermocouples in all. Safety devices are provided to stop the conveyors in an emergency, when a bell rings and a red light flashes as a danger alarm.

Air in the finishing room is kept

(CONTINUED ON PAGE 97)

Equipment For High-Pressure Casting Of Metals In Plastic State

THE Madison-Kipp Corp., Madison, Wis., has just announced new equipment for casting brass and rigid analysis aluminum by the high-pressure method of casting metals in the plastic state. The new list of products includes three machines, five sizes of hydraulic pumping units and a new design for electric holding furnaces.

The experience of Josef Polak of Prague, Czechoslovakia, Europe's leading exponent of high-pressure brass die casting, has been available to the Madison-Kipp organization for some time. Arrangements were made with Transforma Actien Gesellschaft, who owns many of Polak's latest patents, for exclusive manufacturing license in the United States, Canada and several other countries.

The machine here illustrated is Model 256. It is fully hydraulic in operation, as is the case with all models and sizes in the new series of machines. One of the unusual and novel features of the plastic metal type of casting machine is that the casting metal well is provided in each die. This well is made to the proper size for the forcing plunger of the machine having only a small amount of clearance for ease of operation.

This clearance is varied somewhat with the type of metal to be cast. Provision is made in the machine so that ejection of the casting can be made on either the movable or the stationary half of the die. This permits considerably more latitude than is usual in designing complicated dies and dies requiring special coring.

Madison-Kipp Hydraulic Power unit No. P-2 is supplied with the 256. Line pressures are up to 2500 lb., which provide a die holding pressure of 30,000 lb. and 7700 lb. per sq. in. for the standard diameter metal forcing plunger. Arrangements for higher plunger pressures are available where necessary, and the speed of travel of the forcing plunger may be regulated to suit the casting conditions of various metals and for particular requirements of special dies. In the larger machines the metal forcing pressures may exceed 20,000 lb. per sq. in.

Metal for casting is held in a plastic stage in the newly designed holding furnace. Almost any metals which have a plastic range can be cast. The 256 machine, as well as the 1220 or 900 machines, may be equipped with hydraulic core pulling mechanism to actuate cores

from either side of the machine or at the bottom of the die. As is the case with Madison-Kipp automatic and semi-automatic machines, mechanical core pulling devices and automatic ejector mechanism may be applied to this brass type of die casting machine.

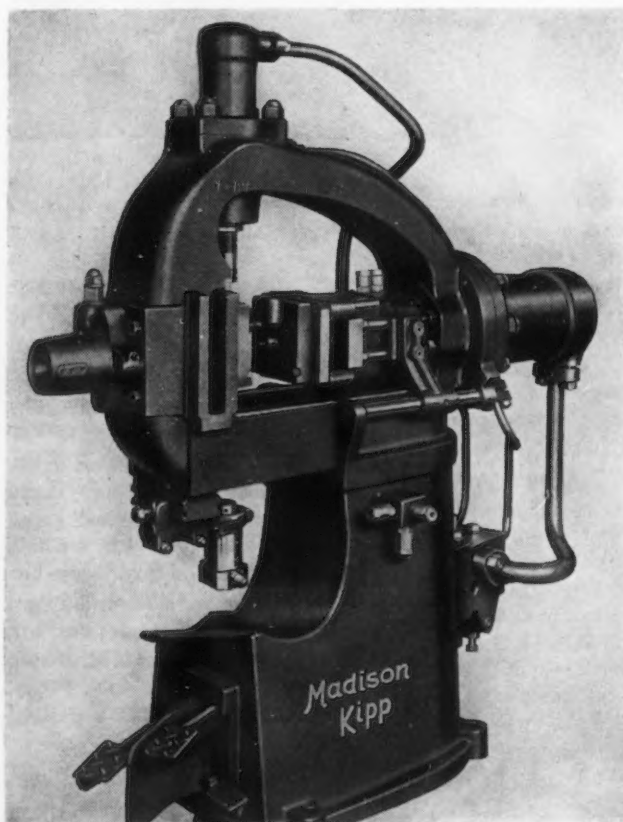
Improved 2-In. Landis Threading Machine

AN improved design of its 2-in. threading machine has been announced by the Landis Machine Co., Waynesboro, Pa. Improvements apply to both belt and motor-driven models. Power is delivered to the belt-driven machine through tight and loose pulleys mounted on the main drive-shaft. The drive is directly from a line-shaft, without a countershaft, and a belt shifter is provided for starting and stopping the machine.

Speed changes are effected through a pick-off gear box on the headstock, speeds ranging from 31 to 118 r.p.m. being obtainable with the gears regularly supplied. A speed-change plate on the gear box shows the proper gears for the various speeds.

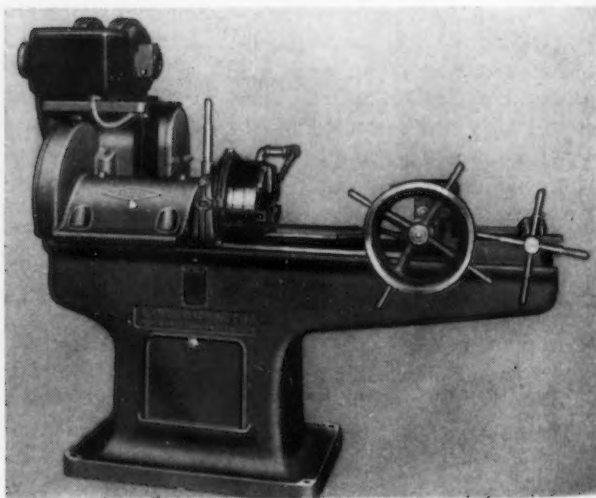
The motor-driven machine, here illustrated, has the motor mounted on a plate on top of the headstock and connected to the gear box by a silent chain drive.

The bed of the machine is thicker and has more and heavier reinforcing webs than before. Mounting of the headstock directly on top of the bed is said also to add to the rigidity of the machine. The coolant pump is mounted close to the bed to save floor space. The machine is furnished either with the Landis standard rotary die head or the heat-treated Lanco head. It is equipped with the same carriage and vise as before, and can be furnished with or without a leadscrew.



AT LEFT
A METAL well is provided for each die of this plastic metal casting machine.

BELOW
MOTOR-DRIVEN model of new Landis threading machine.



Portable Balancer Made Easier to Operate

IMPROVEMENTS in the design of the Davey portable balancing equipment have been announced by the Electrocon Corp., 6 Varick Street, New York.

Complete equipment suitable for balancing of large turbines and auxiliary machines such as fans, exhausters, pumps and motors, is here illustrated. The photographic feature of the "two-direction" Vibrometer enables records of turbine vibrations to be made periodically, which is often the means of discovering troubles before they become serious. A model-S2 Vibrometer, which measures in two directions simultaneously and also indicates wave form, is shown at the right in the illustration and the single direction" model-I Vibrometer in the center. These two Vibrometers may be used interchangeably. A model-3 stroboscopic lamp with three neon tubes is shown at the left.

COMPLETE
equipment
for balancing
large turbines
and auxiliaries.



scopic lamp with three neon tubes is shown at the left.

In the foreground at the left is shown a breaker head and phase adjuster coupled to a synchronous motor unit, the latter a new feature used for balancing 60-cycle machines running at 3600, 1800 or 1200 r.p.m. By its use it is unnecessary to couple the breaker head to the machine shaft, and the motor and breaker head may be placed at any point convenient for the operator. For machines running at other speeds the breaker head is driven from the end of the shaft by a tachometer point.

Patterson Improves Portable Power Mixer

THE line of Typhoon portable power mixers manufactured by the Patterson Foundry & Machine Co., East Liverpool, Ohio, has recently been redesigned to provide various improvements and to increase their portability. Weight has been reduced by the use of aluminum. The motor frame, end bells and lower housing are all made of polished aluminum. Polished aluminum and chromium plated finish are employed throughout, no paint being used on these new models. The weight saving is as much as 10 lb. in the ¼-hp. size.

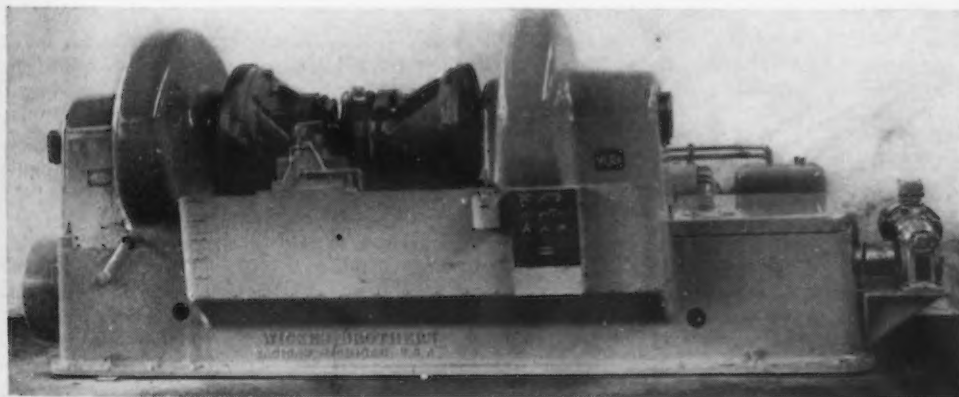
The geared Typhoon mixers have a bronze ball bearing gear reducer which is said to be chatter free and silent under all loads.

All Patterson Typhoon mixers are fitted with fan cooled, down-draft, self ventilating motors as standard equipment and with starting switches built inside the motor frames. The propellers, it is pointed out, assure complete mixing in the vertical plane, and the adjustable shaft is equipped with heavy duty guide bearings to eliminate whip.

Large Crankshaft Lathe Has Automatic Cycle

THE automatic universal crankshaft lathe here pictured is a recent development of Wickes Brothers, Saginaw, Mich., for the machining of large Diesel and tractor-type crankshafts. It has an automatic work cycle, comprising power, rapid traverse, coarse feed, fine feed, diameter stop, dwell, rapid return of the tools, and automatic stopping of the lathe in the unloading position. Control is entirely through the push-button station at the front of the machine.

Hydraulic feed, force feed lubrication and anti-friction bearings are regularly provided. The lathe swings 30 in. over the cross-slide, and has an adjustable tailstock that may be positioned along the bed to accommodate crankshafts of different lengths. It is driven by a 15-hp. constant-speed motor through multiple V-belts. With electrical equipment, it weighs 28,000 lb., net.



WICKES model
UH-8 lathe for
machining large
crankshafts. The
work cycle is auto-
matic and control is
entirely through the
push-button station
at the front.

Steel Industry Earned 4.4 Per Cent on Invested Capital in 1936

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By N. E. MACMILLAN

Associate Editor

o o o

TWENTY-TWO steel companies, with a combined annual ingot capacity of 63,282,058 gross tons, or 91.4 per cent of the industry's total, earned 4.4 per cent on their invested capital in 1936. Production for the industry as a whole last year was the third largest in history, but, as brought to light by THE IRON AGE's latest analysis of steel company earnings, the return on investment was unusually low, contrasting with a yield many times greater in some other large industries.

The total amount earned on the invested capital last year by these 22 companies, which is taken to be the earnings after costs, including taxes, but before interest charges and dividends, was \$168,957,568. Since the total investment as at the end of 1936 exceeded \$3,800,000,000, the earnings constituted a return of only 4.4 per cent, or less than 4½c. on the dollar. After payment of interest on funded debt, the total net profit available for dividends amounted to \$137,552,175. However, when preferred dividend requirements are taken into account, the profit remaining was equivalent to an average of \$3.05 a share on the common stock outstanding.

Profit Margin Was 6.2 Per Cent

Combined net receipts for the sale of goods and services by 19 companies last year, the largest number shown on the accompanying table to report sales, totaled \$2,160,511,437, but only 6.2 per cent of this sum accrued as profit. The low profit margin is accounted for by the heavy costs steel companies face in conducting their business. Wages, taxes, operating costs, incidental expense and numerous other levies consume the bulk of their annual revenue, and in 1936 specifically claimed about 94 cents out of every dollar the industry took in.

Since the 22 companies included in this survey had a combined annual ingot capacity on Dec. 31, 1936, of 63,282,058 gross tons, their

net earnings of \$137,552,175 in 1936 averaged \$2.17 per ton of ingot capacity. A large representation as to production is impossible, although nine companies which reported their output had average net earnings of \$2.81 per ton of ingots produced.

The average capitalization per ton of capacity for all companies last year was \$60.58. United States Steel Corp. was capitalized at \$64.73 a ton. Bethlehem Steel Corp. was capitalized at \$67.18 a ton, and Republic Steel Corp. at \$51.13 a ton. U. S. Steel earned \$1.96 per ton of ingot capacity, but Inland Steel Co., which earned \$5.47 a ton, made the best showing of the principal producers of ordinary carbon steel. Ludlum Steel Co., which specializes in alloys, exceeded all others at \$27.40 a ton.

Inland and National Made Best Showing

Among the prominent interests, Inland Steel Co. and National Steel Corp. demonstrated the greatest earning power. The former company leading with a net profit margin of 12.9 per cent and a return on its capital investment of 11.8 per cent. Both these producers, incidentally, are important makers of relatively light, highly finished products. Youngstown Sheet & Tube Co., one of the large producers of pipe as well as other steel products, performed well, having netted \$3.39 per ton of ingot capacity and 7.1 per cent on its invested capital.

Pittsburgh Steel Co., the only one of the 22 producers to report an operating deficit in its last fiscal year, is mainly a producer of wire products. Both this firm and Lukens Steel Co., however, were

penalized by the fact that their fiscal periods ended prior to Dec. 31 so that neither obtained all the benefits of the improved business conditions prevailing over the latter part of 1936. Lukens Steel Co., whose output is very largely plates, earned approximately 15c. per ton of capacity, placing it at the bottom of the list of the 21 companies which operated at a profit last year.

Larger Companies Lagged

The five largest companies, all of which are included in the group of eight companies for which complete representation is given in the adjoining table, appear to have attained less than average results from their 1936 operations. Since the totals for this group separately are heavily weighted in favor of the five largest producers, it is apparent that the biggest steel interests suffer somewhat by comparison with smaller companies. Their net earnings in 1936 averaged, for example, only \$1.85 per ton of ingot capacity, whereas the average for practically the entire industry was \$2.17 a ton. The largest companies likewise show an average profit margin of 5.5 per cent, against 6.2 per cent for the industry, and a return on invested capital of 3.7 per cent, against 4.4 per cent for the industry. Their average capitalization per ton of ingot capacity was \$61.65, or slightly higher than the figure of \$60.58 given for all 22 companies.

Average production for the group of eight companies during 1936 was at the rate of 66.7 per cent of capacity, compared with 68.5 per cent for the industry as a whole.

Total assets of all 22 companies as of Dec. 31, 1936, exceeded \$4,200,000,000. Their combined long term debt amounted to more than \$687,000,000. The total preferred stock issue was slightly less than this, but in common stock there was more than \$1,700,000,000 outstanding. The combined surplus totaled nearly \$720,000,000.

FINANCIAL ANALYSIS

RESULTS FROM OPERATIONS OF 22 PROD

| NAME OF COMPANY | Ingot Capacity Gross Tons | Ingot Production Gross Tons | Operating Ratio | Net Sales | Net Profit | Net Profit Margin Per Cent | Number of Common Shares Outstanding | Earnings Per Common Share | |
|----------------------------------|---------------------------------|-----------------------------------|--------------------|---------------|---------------|-------------------------------------|--|------------------------------------|--|
| UNITED STATES STEEL CORP..... | 25,772,400 | 16,907,996 | 65.6 | \$857,749,717 | \$50,583,356 | 5.9 | 8,703,252 | \$2.91 | |
| BETHLEHEM STEEL CORP..... | 9,360,000 | 5,993,647 | 64.0 | 288,053,862 | 13,901,006 | 4.8 | 3,191,614 | 2.09 | |
| REPUBLIC STEEL CORP..... | 6,053,000 | 4,291,832 | 70.9 | 218,317,399 | 9,586,922 | 4.4 | 4,127,264 | 1.73 | |
| JONES & LAUGHLIN STEEL CORP... | 3,671,200 | 2,375,103 | 64.7 | 94,406,292 | 4,129,600 | 4.4 | 576,320 | 0.03 | |
| YOUNGSTOWN SHEET & TUBE CO... | 3,120,000 | 2,218,320 | 71.1 | 127,674,517 | 10,564,501 | 8.3 | 1,384,752 | 7.03 | |
| NATIONAL STEEL CORP..... | 2,700,000 | | | 123,074,149 | 12,541,842 | 10.2 | 2,162,277 | 5.80 | |
| AMERICAN ROLLING MILL CO..... | 2,531,120 | | | 101,463,383 | 6,441,677 | 6.3 | 2,803,860 | 2.25 | |
| INLAND STEEL CO..... | 2,340,000 | | 92.5 | 98,903,896 | 12,800,545 | 12.9 | 1,499,000 | 8.53 | |
| WHEELING STEEL CORP..... | 1,750,000 | 1,333,034 | 76.2 | 80,598,525 | 4,115,388 | 5.1 | 388,091 | 4.70 | |
| CRUCIBLE STEEL CO. OF AMERICA... | 963,350 | 715,962 | 74.3 | | 3,120,356 | | 450,000 | 3.04 | |
| OTIS STEEL CO..... | 872,000 | | | 28,875,577 | 1,980,149 | 6.9 | 891,130 | 1.31 | |
| LUKENS STEEL CO.#..... | 754,000 | 369,919 | 49.1 | 12,978,007 | 112,206 | 0.9 | 317,976 | 0.35 | |
| PITTSBURGH STEEL CO.φ..... | 721,500 | | | 21,352,326 | 265,360x | 1.2x | 253,500 | 3.93x | |
| SHARON STEEL CORP..... | 500,000 | 435,000 | 87.0 | 21,185,510 | 1,305,852 | 6.2 | 377,309 | 2.93 | |
| ALLEGHENY STEEL CO..... | 476,000 | | | 31,528,219 | 1,829,137 | 5.8 | 750,655 | 2.12 | |
| GULF STATES STEEL CO..... | 400,500 | | | 12,778,373 | 660,112 | 5.2 | 296,069 | 1.75 | |
| GRANITE CITY STEEL CO..... | 400,000 | | | 10,177,911 | 288,687 | 2.8 | 382,488 | 0.75 | |
| CONTINENTAL STEEL CORP.φ..... | 280,000 | | | 16,535,401 | 715,914 | 4.3 | 200,590 | 2.67 | |
| MIDVALE CO..... | 273,024 | | | | 1,266,168 | | 200,000 | 6.33 | |
| LACLEDE STEEL CO..... | 248,964 | | | | 240,656 | | 206,250 | 1.16 | |
| VANADIUM-ALLOYS STEEL CO.φ..... | 57,000 | | | 4,029,156 | 592,216 | 14.7 | 202,136 | 2.92 | |
| LUDLUM STEEL CO..... | 38,000 | | | 10,829,217 | 1,041,245 | 9.6 | 496,437 | 2.09 | |
| 22 COMPANIES..... | 63,282,058 | | | | 137,552,175 | | 29,860,970 | 3.05 | |
| 19 COMPANIES..... | 61,796,720 | | | 2,160,511,437 | 132,924,995 | 6.2 | | | |
| 9 COMPANIES..... | 51,943,950 | 34,640,813 | 66.7 | | 97,419,187 | | | | |
| 8 COMPANIES..... | 50,980,600 | 33,924,851 | 66.5 | 1,700,963,829 | 94,298,831 | 5.5 | 19,066,578 | 2.72 | |

Fiscal year ends Oct. 30.

φ Fiscal year ends June 30.

x Indicates loss.

Calculations are complete in most respects for all 22 companies. However, as three companies did not report their sales, it is possible to show a combined net profit margin for only 19 companies. Similarly, the aggregate amount earned per ton of ingots produced can be shown for only nine companies. Complete representation is given for only eight companies, as one company which reported its production did not report its sales.

CIAL ANALYSIS OF THE STEEL INDUSTRY FOR 1936

RESULTS FROM OPERATIONS OF 22 PRODUCERS HAVING 91.4 PER CENT OF THE COUNTRY'S ANNUAL INGOT CAPACITY

| Net Profit | Net Profit Margin Per Cent | Number of Common Shares Outstanding | Earnings Per Common Share | Earnings Per Ton of Ingot Capacity | Earnings Per Ton of Ingots Produced | Total Assets | Funded Debt | Preferred Stock | Common Stock | Surplus | Total Invested Capital | Earnings on Invested Capital | Per Re In C |
|--------------|----------------------------|-------------------------------------|---------------------------|------------------------------------|-------------------------------------|-----------------|---------------|-----------------|---------------|---------------|------------------------|------------------------------|-------------|
| \$50,583,356 | 5.9 | 8,703,252 | \$2.91 | \$1.96 | \$2.99 | \$1,863,976,519 | \$103,790,737 | \$360,281,100 | \$870,325,200 | \$333,910,738 | \$1,668,307,775 | \$55,531,314 | |
| 13,901,006 | 4.8 | 3,191,614 | 2.09 | 1.49 | 2.32 | 676,060,838 | 155,982,619 | 112,066,440 | 303,203,330 | 57,562,527 | 628,814,916 | 20,415,453 | |
| 9,586,922 | 4.4 | 4,127,264 | 1.73 | 1.58 | 2.23 | 343,949,673 | 110,992,148 | 40,190,050 | 93,995,228 | 64,299,963 | 309,477,389 | 14,599,260 | |
| 4,129,600 | 4.4 | 576,320 | 0.03 | 1.12 | 1.74 | 220,670,844 | 36,061,141 | 58,713,900 | 57,632,000 | 49,304,909 | 201,711,950 | 5,321,609 | |
| 10,564,501 | 8.3 | 1,384,752 | 7.03 | 3.39 | 4.76 | 213,822,893 | 78,276,250 | 15,000,000 | 86,803,097 | 19,375,547 | 199,454,894 | 14,247,644 | |
| 12,541,842 | 10.2 | 2,162,277 | 5.80 | 4.65 | | 189,530,502 | 59,000,000 | None | 54,056,925 | 56,131,836 | 169,188,761 | 14,849,830 | |
| 6,441,677 | 6.3 | 2,803,860 | 2.25 | 2.54 | | 128,649,729 | 25,914,687 | 1,931,900 | 70,096,508 | 12,660,859 | 110,603,954 | 8,353,580 | |
| 12,800,545 | 12.9 | 1,499,000 | 8.53 | 5.47 | | 137,644,116 | 44,000,000 | None | 50,566,352 | 29,282,078 | 123,848,430 | 14,611,348 | |
| 4,115,388 | 5.1 | 388,091 | 4.70 | 2.35 | 3.09 | 118,824,534 | 33,628,000 | 38,205,031 | 19,404,550 | 18,478,194 | 109,715,775 | 5,636,288 | |
| 3,120,356 | | 450,000 | 3.04 | 3.24 | 4.36 | 112,818,358 | 7,750,000 | 25,000,000 | 45,000,000 | 27,360,213 | 105,110,213 | 3,571,672 | |
| 1,980,149 | 6.9 | 891,130 | 1.31 | 2.27 | | 36,156,077 | 10,827,500 | 11,103,140 | 4,455,650 | 5,816,053 | 32,202,343 | 2,695,214 | |
| 112,206 | 0.9 | 317,976 | 0.35 | 0.15 | 0.30 | 14,057,275 | 3,633,400 | None | 3,179,760 | 3,685,863 | 10,499,023 | 295,868 | |
| 265,360x | 1.2x | 253,500 | 3.93x | 3.68x | | 46,121,064 | 6,947,000 | 10,475,000 | 25,350,000 | 698,479 | 43,470,479 | 252,419 | |
| 1,305,852 | 6.2 | 377,309 | 2.93 | 2.61 | 3.00 | 18,157,938 | 2,000,000 | 4,000,000 | 3,773,090 | 5,325,196 | 15,098,286 | 1,483,570 | |
| 1,829,137 | 5.8 | 750,655 | 2.12 | 3.84 | | 22,973,010 | None | 3,342,600 | 4,691,594 | 10,689,172 | 18,723,366 | 1,829,137 | |
| 660,112 | 5.2 | 296,069 | 1.75 | 1.65 | | 30,741,933 | 7,000,000 | None | 19,807,070 | 2,535,611 | 29,342,681 | 968,740 | |
| 288,687 | 2.8 | 382,488 | 0.75 | 0.72 | | 14,356,420 | None | None | 8,483,821 | 3,574,269 | 12,058,090 | 288,687 | |
| 715,914 | 4.3 | 200,590 | 2.67 | 2.56 | | 14,344,482 | 1,500,000 | 2,567,926 | 5,276,971 | 3,471,720 | 12,816,617 | 786,045 | |
| 1,266,168 | | 200,000 | 6.33 | 4.64 | | 13,823,873 | None | None | 10,574,621 | 1,650,598 | 12,225,219 | 1,266,168 | |
| 240,656 | | 206,250 | 1.16 | 0.97 | | 7,559,629 | None | None | 4,125,000 | 1,675,002 | 5,800,002 | 240,656 | |
| 592,216 | 14.7 | 202,136 | 2.92 | 10.39 | | 6,376,700 | None | None | 1,498,944 | 4,422,119 | 5,921,063 | 952,216 | |
| 1,041,245 | 9.6 | 496,437 | 2.09 | 27.40 | | 10,066,860 | 466,855 | None | 496,437 | 8,018,570 | 8,981,862 | 1,120,850 | |
| 137,552,175 | | 29,860,970 | 3.05 | 2.17 | | 4,240,683,267 | 687,770,337 | 682,877,087 | 1,742,796,148 | 719,929,516 | 3,833,373,088 | 168,957,568 | |
| 132,924,995 | 6.2 | | | | 2.81 | | | | | | | | |
| 97,419,187 | | | | | 2.78 | | | | | | | | |
| 94,298,831 | 5.5 | 19,066,578 | 2.72 | 1.85 | | 3,469,520,514 | 524,364,295 | 628,456,521 | 1,438,316,255 | 551,942,937 | 3,143,080,008 | 117,531,006 | |

x Indicates loss.

ects for all 22 companies. However, as three companies did show a combined net profit margin for only 19 companies. d per ton of ingots produced can be shown for only nine is given for only eight companies, as one company which ts sales.

Figures for the column, "Earnings on Invested Capital," represent earnings after expenses but before dividends and interest charges on funded debt. "Earnings per Common Share" are shown after allowance for a year's dividend requirements on the preferred stocks. As in the case of Pittsburgh Steel Co., these requirements are considered even though a prior loss for the year is indicated.

OF THE STEEL INDUSTRY FOR 1936

PRODUCERS HAVING 91.4 PER CENT OF THE COUNTRY'S ANNUAL INGOT CAPACITY

| Rank | Earnings Per Ton of Ingot Capacity | Earnings Per Ton of Ingots Produced | Total Assets | Funded Debt | Preferred Stock | Common Stock | Surplus | Total Invested Capital | Earnings on Invested Capital | Per Cent Return on Invested Capital | Capitaliza- tion Per Ton of Ingot Capacity | NAME OF COMPANY |
|------|---|--|-----------------|----------------|--------------------|-----------------|---------------|------------------------------|------------------------------------|--|---|-------------------------------|
| 91 | \$1.96 | \$2.99 | \$1,863,976,519 | \$103,790,737 | \$360,281,100 | \$870,325,200 | \$333,910,738 | \$1,668,307,775 | \$55,531,314 | 3.3 | \$64.73 | UNITED STATES STEEL CORP. |
| 99 | 1.49 | 2.32 | 676,060,838 | 155,982,619 | 112,066,440 | 303,203,330 | 57,562,527 | 628,814,916 | 20,415,453 | 3.2 | 67.18 | BETHLEHEM STEEL CORP. |
| 73 | 1.58 | 2.23 | 343,949,673 | 110,992,148 | 40,190,050 | 93,995,228 | 64,299,963 | 309,477,389 | 14,599,260 | 4.7 | 51.13 | REPUBLIC STEEL CORP. |
| 103 | 1.12 | 1.74 | 220,670,844 | 36,061,141 | 58,713,900 | 57,632,000 | 49,304,909 | 201,711,950 | 5,321,609 | 2.6 | 54.94 | JONES & LAUGHLIN STEEL CORP. |
| 103 | 3.39 | 4.76 | 213,822,893 | 78,276,250 | 15,000,000 | 86,803,097 | 19,375,547 | 199,454,894 | 14,247,644 | 7.1 | 63.93 | YOUNGSTOWN SHEET & TUBE CO. |
| 80 | 4.65 | ..... | 189,530,502 | 59,000,000 | None | 54,056,925 | 56,131,836 | 169,188,761 | 14,849,830 | 8.8 | 62.66 | NATIONAL STEEL CORP. |
| 25 | 2.54 | ..... | 128,649,729 | 25,914,687 | 1,931,900 | 70,096,508 | 12,660,859 | 110,603,954 | 8,353,580 | 7.6 | 43.70 | AMERICAN ROLLING MILL CO. |
| 53 | 5.47 | ..... | 137,644,116 | 44,000,000 | None | 50,566,352 | 29,282,078 | 123,848,430 | 14,611,348 | 11.8 | 52.93 | INLAND STEEL CO. |
| 70 | 2.35 | 3.09 | 118,824,534 | 33,628,000 | 38,205,031 | 19,404,550 | 18,478,194 | 109,715,775 | 5,636,288 | 5.1 | 62.69 | WHEELING STEEL CORP. |
| 104 | 3.24 | 4.36 | 112,818,358 | 7,750,000 | 25,000,000 | 45,000,000 | 27,360,213 | 105,110,213 | 3,571,672 | 3.4 | 109.11 | CRUCIBLE STEEL CO. OF AMERICA |
| 31 | 2.27 | ..... | 36,156,077 | 10,827,500 | 11,103,140 | 4,455,650 | 5,816,053 | 32,202,343 | 2,695,214 | 8.4 | 36.93 | OITS STEEL CO. |
| 35 | 0.15 | 0.30 | 14,057,275 | 3,633,400 | None | 3,179,760 | 3,685,863 | 10,499,023 | 295,868 | 2.8 | 13.92 | LUKENS STEEL CO. |
| 93x | 3.68x | ..... | 46,121,064 | 6,947,000 | 10,475,000 | 25,350,000 | 698,479 | 43,470,479 | 252,419 | 0.6 | 60.25 | PITTSBURGH STEEL CO. |
| 93 | 2.61 | 3.00 | 18,157,938 | 2,000,000 | 4,000,000 | 3,773,090 | 5,325,196 | 15,098,286 | 1,483,570 | 9.8 | 30.20 | SHARON STEEL CORP. |
| 12 | 3.84 | ..... | 22,973,010 | None | 3,342,600 | 4,691,594 | 10,689,172 | 18,723,366 | 1,829,137 | 9.8 | 39.33 | ALLEGHENY STEEL CO. |
| 75 | 1.65 | ..... | 30,741,933 | 7,000,000 | None | 19,807,070 | 2,535,611 | 29,342,681 | 968,740 | 3.3 | 73.27 | GULF STATES STEEL CO. |
| 75 | 0.72 | ..... | 14,356,420 | None | None | 8,483,821 | 3,574,269 | 12,058,090 | 288,687 | 2.4 | 30.15 | GRANITE CITY STEEL CO. |
| 67 | 2.56 | ..... | 14,344,482 | 1,500,000 | 2,567,926 | 5,276,971 | 3,471,720 | 12,816,617 | 786,045 | 6.1 | 45.77 | CONTINENTAL STEEL CORP. |
| 33 | 4.64 | ..... | 13,823,873 | None | None | 10,574,621 | 1,650,598 | 12,225,219 | 1,266,168 | 10.4 | 44.78 | MIDVALE CO. |
| 16 | 0.97 | ..... | 7,559,629 | None | None | 4,125,000 | 1,675,002 | 5,800,002 | 240,656 | 4.1 | 23.30 | LACLEDE STEEL CO. |
| 92 | 10.39 | ..... | 6,376,700 | None | None | 1,498,944 | 4,422,119 | 5,921,063 | 952,216 | 10.0 | 103.88 | VANADIUM-ALLOYS STEEL CO. |
| 99 | 27.40 | ..... | 10,066,860 | 466,855 | None | 496,437 | 8,018,570 | 8,981,862 | 1,120,850 | 12.5 | 236.36 | LUDLUM STEEL CO. |
| 05 | 2.17 | ..... | 4,240,683,267 | 687,770,337 | 682,877,087 | 1,742,796,148 | 719,929,516 | 3,833,373,088 | 168,957,568 | 4.4 | 60.58 | 22 COMPANIES |
| | | 2.81 | | | | | | | | | | 19 COMPANIES |
| | | | | | | | | | | | | 9 COMPANIES |
| 72 | 1.85 | 2.78 | 3,469,520,514 | 524,364,295 | 628,456,521 | 1,438,316,255 | 551,942,937 | 3,143,080,008 | 117,531,006 | 3.7 | 61.65 | 8 COMPANIES |

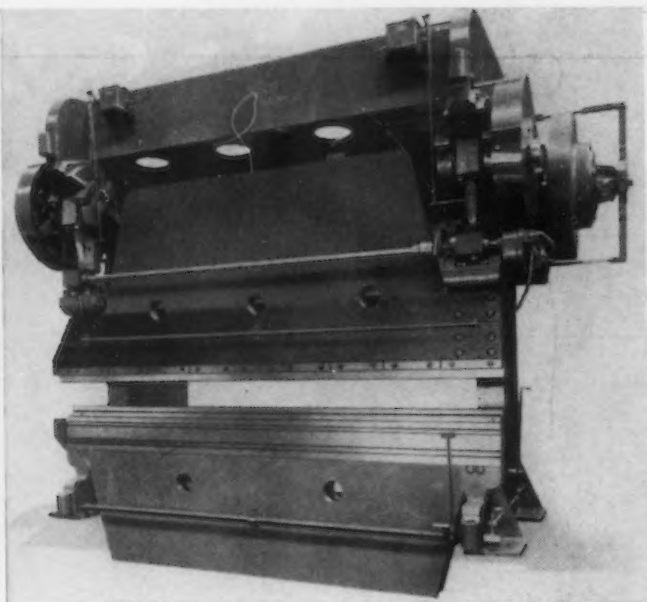
Figures for the column, "Earnings on Invested Capital," represent earnings after expenses but before dividends and interest charges on funded debt. "Earnings per Common Share" are shown after allowance for a year's dividend requirements on the preferred stocks. As in the case of Pittsburgh Steel Co., these requirements are considered even though a prior loss for the year is indicated.



Portable Pyrometer Easily Handled

KNOwn as the "Pyramid," the portable pyrometer above illustrated, a new product of the Tamms Silica Co., Chicago, is said to be particularly adaptable for use by foundrymen. A calibration adjustment is conveniently located on the face of the dial, and room temperature may be readily compensated. The extension tube is made of aluminum and it is fitted at the thermocouple end with a flexible

arm which is adjustable to 180 deg. This construction eliminates swivel joints and brush or friction contacts. All electrical parts and connections are fully inclosed. All parts are interchangeable. The handle is of the pistol grip type to afford ease in handling and to bring the face of the indicating dial into correct position for quick readings.



either side of the ram to be raised or lowered individually for realignment or for taper work. V-belt drive, gear tooth drive friction clutch, motor adjustment on the ram, automatic force feed lubricators, and lower die holder are regular equipment. The machine is illustrated above.

Grinder Adapted for Alloy Steel Sheets

ADAPTATION of its No. 453 wide-belt sheet grinder for the application of factory-coated abrasive belts for grinding stainless steel and other alloy sheets has been announced by the Mattison Machine Works, Rockford, Ill. Construction adapts itself for quick application of belts. Push button station and controls for the table are located accessibly at front of the machine. Contact rolls are removable and rolls of any degree of cushion may be easily substituted according to the nature of the work. This sheet grinder can be furnished in various widths and lengths. The machine illustrated is made to carry belts 50-in. wide to grind sheets 48-in. wide by 14-ft. long.

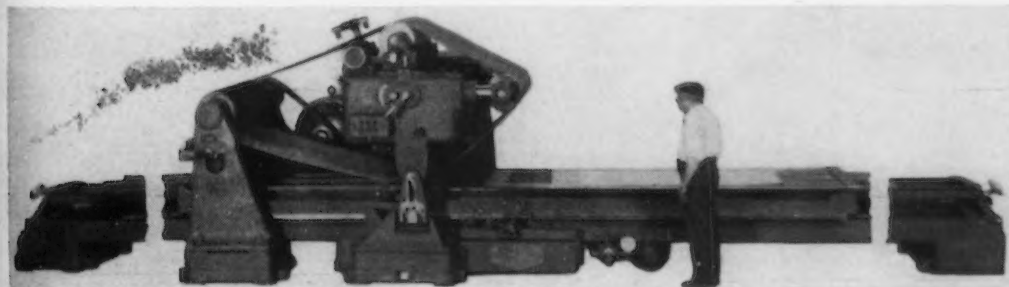
Steel Press Brakes Built in 20 Sizes

A COMPLETE line of Verson press brakes comprising five series and 20 different sizes has been placed on the market by the Allsteel Press Co., 12015 South Peoria Street, Chicago. Variations from standard dimensions are readily obtainable.

These press brakes are built entirely of steel, heavy steel plate sections being welded into rigid members. Main bearings are located to absorb the load directly in the center of the main housing plates,

these bearings being of split cap design and equipped with bronze bushings. The pitman connection incorporated is designed to reduce to a minimum the bending moment on the adjusting screws.

The bed is deep and is of two plate construction to permit slugs to fall through in gang punching. It rests on a round saddle in the housing. Another feature is the elevating shaft, which is split and connected by means of a jaw coupling, an arrangement that allows



THE factory-coated abrasive belts for grinding stainless steel and other alloy sheets may be applied quickly.

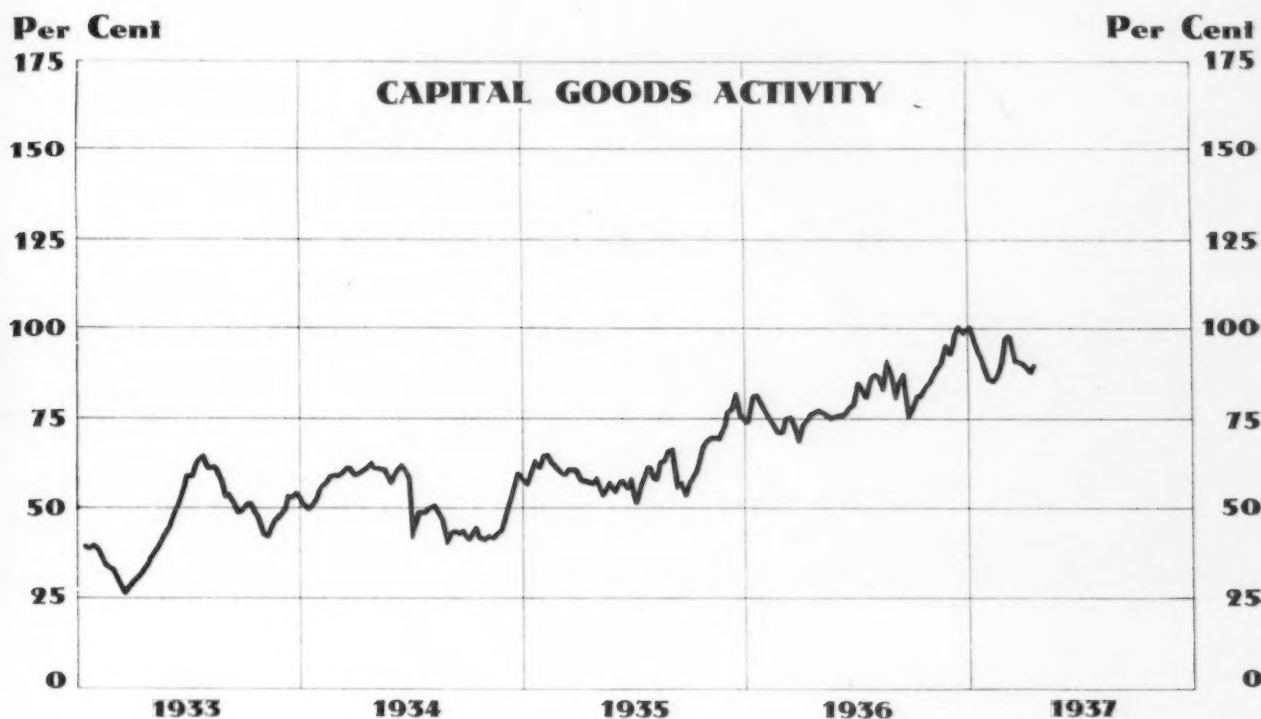
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

| | March, 1937 | February, 1937 | March, 1936 | Three Months, 1936 | Three Months, 1937 |
|--|----------------|-------------------|----------------|--------------------------|--------------------------|
| Raw Materials: | | | | | |
| Lake ore consumption (gross tons) ^a | | 4,443,306 | 2,897,867 | 8,481,741 | |
| Coke production (net tons) ^b | | 4,283,681 | 3,366,665 | 10,110,549 | |
| Pig Iron: | | | | | |
| Pig iron output—monthly (gross tons) ^c | 3,459,473 | 2,999,218 | 2,040,311 | 5,889,902 | 9,670,191 |
| Pig iron output—daily (gross tons) ^c | 111,596 | 107,115 | 65,816 | 64,724 | 107,447 |
| Castings: | | | | | |
| Malleable castings—production (net tons) ^d | | 57,295 | 45,536 | 134,345 | |
| Malleable castings—orders (net tons) ^d | | 60,187 | 48,008 | 130,138 | |
| Steel castings—production (net tons) ^d | | 92,678 | 51,674 | 143,926 | |
| Steel castings—orders (net tons) ^d | | 95,693 | 71,341 | 182,061 | |
| Steel Ingots: | | | | | |
| Steel ingot production—monthly (gross tons) ^e | 5,229,431 | 4,424,659 | 3,342,619 | 9,352,983 | 14,390,787 |
| Steel ingot production—daily (gross tons) ^e | 1,180,458 | 1,106,165 | 754,542 | 719,460 | 1,119,035 |
| Steel ingot production—per cent of capacity ^e | 90.13 | 84.46 | 57.61 | 54.93 | 85.44 |
| Finished steel: | | | | | |
| Trackwork shipments (net tons) ^e | 10,720 | 8,153 | 6,258 | 13,740 | 26,119 |
| Sheet steel sales (net tons) ^f | | | 251,818 | 564,867 | |
| Sheet steel production (net tons) ^f | | | 207,820 | 622,179 | |
| Fabricated shape orders (net tons) ^g | | 88,946 | 108,826 | 370,133 | |
| Fabricated shape shipments (net tons) ^g | | 91,848 | 107,687 | 265,885 | |
| Fabricated plate orders (net tons) ^d | | 30,340 | 30,437 | 97,009 | |
| U. S. Steel Corp. shipments (tons) ^h | 1,414,399 | 1,133,724 | 783,552 | 2,181,281 | 3,698,041 |
| Ohio River steel shipments (net tons) ⁱ | 122,100 | 88,170 | 116,510 | 196,052 | 306,670 |
| Fabricated Products: | | | | | |
| Automobile production, U. S. and Canada ^k | | 383,637 | 438,992 | 1,117,172 | |
| Construction contracts, 37 Eastern States ^l | \$231,245,900 | \$188,257,300* | \$198,761,900 | \$553,973,800 | \$662,347,200 |
| Steel barrel shipments (number) ^d | | | 660,551 | 1,720,572 | |
| Steel furniture shipments (dollars) ^d | | \$2,071,847 | \$1,585,800 | \$4,656,391 | |
| Steel boiler orders (sq. ft.) ^d | | 871,746 | 589,676 | 2,023,427 | |
| Locomotive orders (number) ^m | 29 | 33 | 13 | 73 | 108 |
| Freight car orders (number) ^m | 6,200 | 10,532 | 627 | 8,913 | 27,613 |
| Machine tool index ⁿ | 211.6 | 165.2 | 105.3 | †109.4 | †192.4 |
| Foundry equipment index ^o | 294.2 | 249.5 | 115.0 | †117.4 | †244.8 |
| Foreign Trade: | | | | | |
| Total iron and steel imports (gross tons) ^p | | 41,628 | 56,720 | 150,567 | |
| Imports of pig iron (gross tons) ^p | | 11,340 | 23,743 | 53,436 | |
| Imports of all rolled steel (gross tons) ^p | | 23,134 | 22,046 | 63,212 | |
| Total iron and steel exports (gross tons) ^p | | 290,987 | 264,337 | 719,703 | |
| Exports of all rolled steel (gross tons) ^p | | 115,335 | 92,606 | 237,719 | |
| Exports of finished steel (gross tons) ^p | | 104,007 | 86,676 | 223,318 | |
| Exports of scrap (gross tons) ^p | | 143,197 | 163,295 | 459,366 | |
| British Production: | | | | | |
| British pig iron production (gross tons) ^r | 680,300 | 603,700 | 633,600 | 1,813,800 | 1,934,700 |
| British steel ingot production (gross tons) ^r | 1,109,500 | 995,900 | 980,100 | 2,831,100 | 3,104,300 |
| Non-Ferrous Metals: | | | | | |
| Lead production (net tons) ^s | | 37,451 | 35,150 | 105,573 | |
| Lead shipments (net tons) ^s | | 50,375 | 36,743 | 104,419 | |
| Zinc production (net tons) ^t | 53,202 | 37,794* | 42,411 | 120,209 | 131,043 |
| Zinc shipments (net tons) ^t | 59,635 | 46,953* | 38,087 | 124,274 | 157,815 |
| Deliveries of tin (gross tons) ^v | 9,080 | 7,675 | 5,520 | 17,755 | 24,370 |

† Three months' average. * Revised.

Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



THE IRON AGE Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

| | | | |
|----------------------------|------|----------------------|-------|
| Last week | 89.8 | Same week 1933 | 33.2 |
| Preceding week | 87.5 | Same week 1932 | 36.9 |
| Same week last month | 90.8 | Same week 1931 | 72.8 |
| Same week 1936 | 75.9 | Same week 1930 | 102.2 |
| Same week 1935 | 57.5 | Same week 1929 | 127.4 |
| Same week 1934 | 61.3 | | |

A MARKED increase in automobile production last week caused THE IRON AGE's durable goods index to advance 2.3 points to 89.8 per cent of the 1925-27 average. Output of cars and trucks for the period totaled 127,775 units, compared with 100,470 units in the week preceding. While, in the remaining four industries covered by the index, operations remained either unchanged or declined slightly, their net effect was insufficient to offset the sharp advance in automotive activity.

After adjustment for usual seasonal variation, the durable goods index accordingly registered its first increase in over a month. The gain over its preceding level was 2.3 points, or about 2.6 per cent, but relative to the corresponding week in 1936 it rose 13.9 points, or 18.3 per cent.

There were decreases in construction activity, lumber shipments and in the index of industrial operations at Pittsburgh, but, aside from the material gain in automobile production, steel mill activity during the week held to its previous high level. Figures showing actual operations for each of these series are given below.

| | Latest Week | Change from Preceding Week |
|---|--------------|----------------------------|
| Steel production (per cent of capacity) | 91 | 0 |
| Automobile production (number of cars and trucks) | 127,775 | +27,285 |
| Railroad loadings of forest products (number of cars) | 35,953 | -2,656 |
| Pittsburgh industrial production and shipments (index number) | 104.0 | -0.4 |
| Construction contracts awarded (total value) | \$46,927,000 | -\$3,851,000 |

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

THIS WEEK ON THE ASSEMBLY LINE



... Ford orders huge turbo-generator to increase power for greater production and stiffer competition in auto business.

o o o

... Rich, valve manufacturer, pays \$22.50 dividend to employees; they vote with board of directors and are grievance committee.

o o o

... Goodyear and Goodrich ready to open plants in Michigan after sit-down war.

o o o

... Auto production snaps back to 1929 level for week as union launches drive against Packard and Ford.

DETROIT, April 19.—Tremendous expansion of Ford capacity really appears to be under way as Henry Ford's first step in his announced effort to take personal control over the forces that are swaying industry today. Dominant figure that he is, he has had the automotive world alive with speculation since his statement that his company would soon "demonstrate some real competition in quantity production with new methods that will call for more skill, higher wages and a larger number of employees."

Soon after this pronouncement,

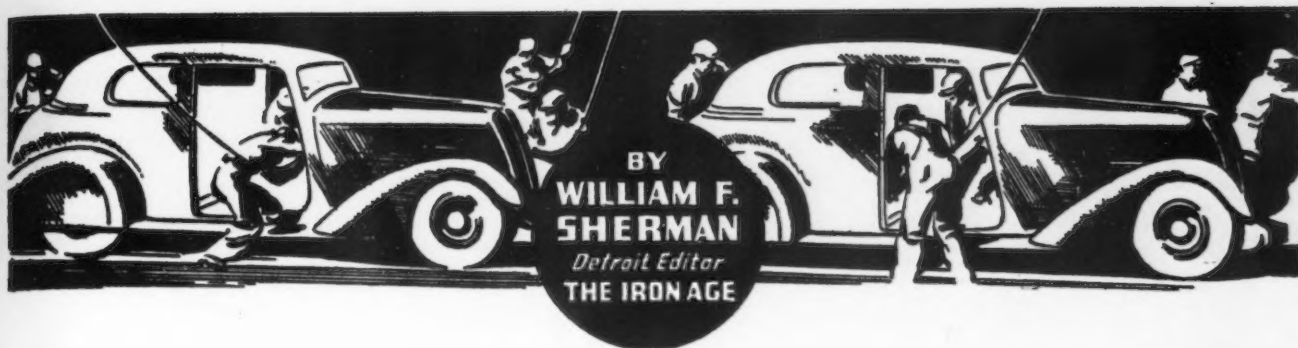
Ford came home from Ways, Ga., and via long-distance telephone placed an order for a \$5,000,000 turbo-generator, the largest of its kind in the United States. The unit, ordered from Gerard Swope, president of General Electric, was reported to be large enough to increase the potential electrical output of the Rouge plant by 50 per cent and will provide for a great increase in manufacturing operations. As reported a week ago in this column, Ford's actual power consumption in 1936 was at an all-time high, 724,567,451 kw. hr.

A seemingly contradictory pol-

icy that really is neither decentralization nor concentration, alone, has been under way at Ford's for a long time. For years there has been a move on to spread out from the huge Rouge plant and to set up small shops in rural communities. The new Northville valve plant is latest evidence of this. Apparently offsetting this policy is the present activity to concentrate all tool and die work in one building now being prepared at the Rouge plant. Modernization and enlargement of facilities in this shop probably will remove from hands of independents much of the Ford job work they have been getting. With his new glass plant, the forthcoming tire plant, and a planned increase in his steel-making plant, Ford is showing further evidence that he plans to be self-contained—at least much more self-contained than before labor took over the reins in his competitors' and suppliers' plants.

Higher Wage, Fewer Hours?

As to Ford's own labor problems, he has conceded that he must bow to the Wagner Labor Act, but most good guessers have it that he will, in effect, buy his way out of the necessity of signing up with unions. Not too wild at all, when viewed in its historical background, is the rumor that a \$10 per day minimum will be set up. The boost from today's \$7 wage is comparable to that when the \$5 day was inaugurated. A 6-hr. day, with four shifts, also is predicted. Wilder, indeed, but still given credence



in many quarters, is the idea that Ford may "socialize" his holdings through issuance of shares to employees. Mr. Ford's advanced age, death taxes, and his hope for a living industrial monument all are arguments advanced.

One Michigan manufacturer in the automotive field already has announced the results of an experiment in a recently adopted employee stock plan. According to Howard H. Rich, secretary-treasurer of the Rich Mfg. Co., Battle Creek, his company, which makes auto valves and tappets, has just paid its initial quarterly dividend to 150 employees. Early in January, in an attempt to get around labor difficulties, Rich gave each employee the equivalent of \$1,500 preferred participating stock. The dividend now paid amounts to \$22.50. Three employees chosen by the workers sit on the board of directors, and meet with the management every Tuesday afternoon to take up, discuss and iron out grievances that have arisen during the week.

Whatever plan Ford himself finally will uncover, his entire program will, without doubt, be tied up with his general theory that increased productivity alone can be the basis for higher wages, or a higher living standard. More efficient management, greater mechanization, more production and lower prices are Ford preachments.

Ford also has just installed two new coke oven batteries and a modern fuel gas distribution system at the Rouge plant. The ovens provide increased gas production

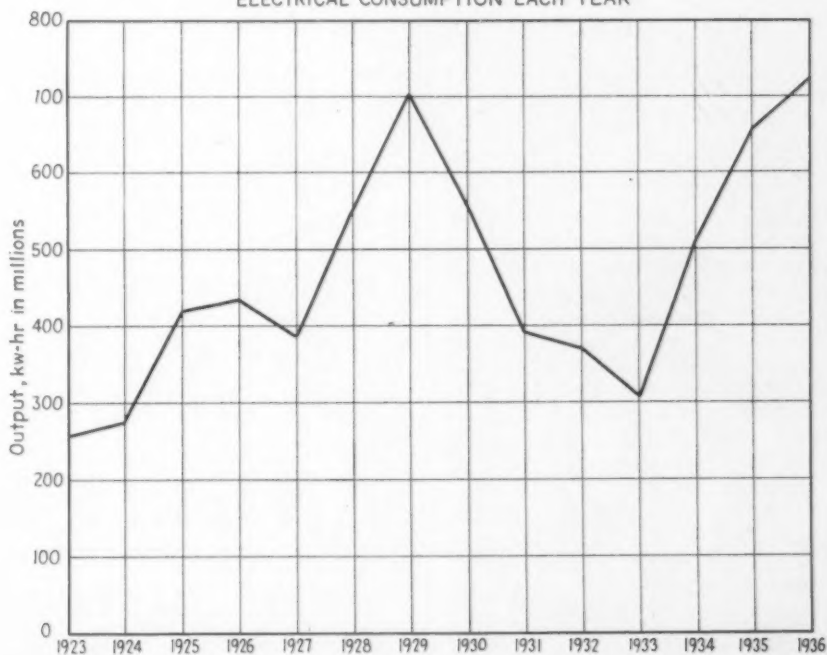
of 8,000,000 cu. ft. daily. The new gas system has three distinct fuel gas sources, the coke ovens, the blast furnace and a new standby station, where gas for emergency uses is supplied by propane tanks.

The modernization program, now approaching completion, is designed to provide increased supply of fuel gas needed for the steadily rising manufacturing program. In addition to the new coke oven battery, the propane gas station and the control equipment, the improvements include new compressors, mixing stations, booster pumps and

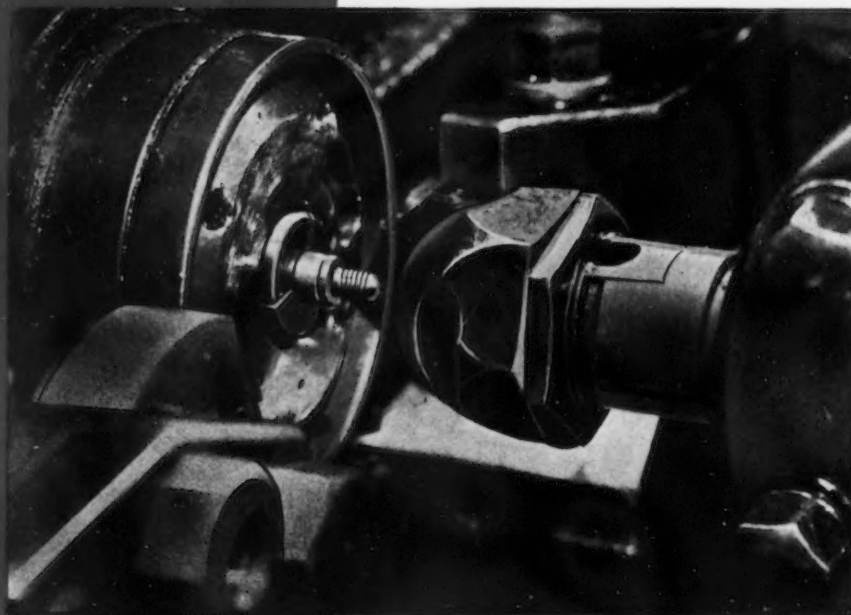
by-products equipment, all of which have been completed, as well as two giant dry seal gas holders, one of 10,000,000, the other of 2,500,000 cu. ft. capacity. The latter is a new center post design, the largest yet built of this type. The new ovens have specially developed motorized toggle wrenches which tighten latches on oven doors.

Expansion of Ford capacity also has been reported from England. Two new bays, each with floor space of 100,000 sq. ft., are being added to the Dagenham plant. The present production of 100,000 units

FORD INDUSTRIAL BAROMETER
ELECTRICAL CONSUMPTION EACH YEAR



Duocone Dies



for fast, accurate,
low cost threading

At the left is a typical installation showing a P&W Duocone Die operating on a small threaded part in an automatic screw machine.



The new P&W Duocone Die is a light, strong, compact tool, designed primarily for use in screw machines. It is equally efficient in bolt-cutters, drill presses and turret lathes. It is designed so that fine, accurate adjustment is possible, and at the same time it is very simple to re-grind. Smooth, accurate threads are produced with the die operating at fairly high speeds. The Duocone feature (opposed tapers) insures correct alignment with the axis of the holder.

The P&W Duocone Die can be furnished in either carbon or high speed steel, with reversing or releasing type holders. At the left are two of the dies without holders, showing their opposed taper construction.

Let us send you complete information on these new cost-cutting tools.

Pratt & Whitney

DIVISION NILES-BEMENT-POND CO.

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per year will be stepped up and more employees will be added to the present payroll of 13,000.

Oldsmobile to Expand

Closer to home, major expansion of the Oldsmobile plant at Lansing, Mich., has been announced as another step in the General Motors policy of leveling out the peaks and valleys of production and thus stabilizing employment. A new building, with 150,000 sq. ft. of floor space, will afford storage space for 35,000 engines, compared with a maximum of 5000 in the present storage space. Storage of sheet metal (fenders and similar parts) will be correspondingly increased. Racks for storage of engines and parts will be of steel. Some idea of the volume of steel required for the racks is contained in the company's announcement of the relative weights of the rack steel and of the structural steel for the building proper. The weight of the building steel is given as 560 tons, while the racks alone will weigh approximately 900 tons.

The tire and rubber industry apparently is less afraid of Michigan sit-downs than the Akron variety. Abandoning the old tire and rubber center in Ohio, both Goodyear and Goodrich are opening big Michigan plants. Operations in the new Jackson plant of Goodyear Tire & Rubber Co. may be started June 1, two weeks ahead of schedule. Nearly 500,000 sq. ft. of factory space is available, including new buildings just constructed to augment the former Kelsey-Hayes Wheel Co. plant. This new plant will manufacture truck and passenger car tires. At Cadillac, 211 miles from Detroit, the B. F. Goodrich Co. has purchased a factory formerly occupied by the Acme Motor Truck Co. for the manufacture of rubber goods.

All weekly records for automobile production since 1929 were exceeded last week when 127,755 units were driven off assembly lines, according to estimates of Ward's Automotive Reports. The automobile industry, recovering with unbelievable speed from its crippling disease of strikes, called all its men back to work and increased output from 100,470, the previous week's total. It exceeded by a few hundred the earlier 1937 peak of 127,134 for the week of March 6. Production for the current week should tax the industry's capacity, and certainly will exceed 130,000.

Retail Sales Active

Even with such output, however, retail sales have built up so fast

that demand is far from satisfied, and few dealers have enough cars. Registrations for March are reported only from 24 states so far, but R. L. Polk & Co. already has revised upward its estimate of 343,000 passenger cars and 52,000 trucks.

Recent gains by the independents possibly are boosted by the fact that the old-line companies already had more orders than they could handle within a reasonable time. However, the fact remains that increases are reported by all of them. Willys-Overland, coincident with payment of a dividend, revealed that production of the new Willys to date, which ends a four-month period, has exceeded the total production for the previous 12 months, during which 25,945 cars were built. Graham gained 52 per cent in the last month over February figures, selling 1400 cars in March. Studebaker started April by selling 3770 cars and trucks in the first ten days, doing 22 per cent better than in last April. Packard had the best month in its entire history with March sales double those of a year ago.

Late in the week dealers and automobile company steel buyers confirmed the fact that the delivery situation on hot-rolled strip suddenly had eased off to three or four weeks instead of seven or eight. Similarly, cold-rolled, on which deliveries had been even

more extended, eased up by approximately a month.

Union offensives were announced for this week against Packard and Ford, obviously the last two names on the UAW list. Twenty-two demands have been made on Packard and a conference is set for Wednesday. A UAW branch office is to be opened close to the Ford plant and the organizers have planned a series of open-air mass meetings for Ford workers. "A voice from the sky" is to assail the ears of Ford workers and executives alike, now that the union has made arrangements to send organizers over the Rouge plant in a loud-speaker-equipped airplane. Other technic being adopted by the union is the slow-down strike, used most of last week at Ternstedt division of General Motors, until negotiations were started under the terms of GM's agreement with the union.

The Gray Iron Founders' Society, 1010 Public Square Building, Cleveland, has issued two booklets entitled "O. K. After Machining" and "New and Useful Facts About Gray Iron." The first is an eight-page pamphlet defining qualities of gray iron castings and gives sources of information on specifications. The second booklet discusses specifications, alloying elements and their effect on castings, and heat treatment. The pamphlets may be obtained free of charge by any purchasing agent on request to his local foundry.



NEARLY 500 more Hudsons and Terraplanes followed this No. 1 car off the Hudson Motor Car Co. assembly line on April 13, the first day after the strike ended. No time was wasted in getting things going again so the industry was able to turn out more cars last week than in any week since 1929, reaching 127,755 units. The workers were so glad to get back to work that they staged an impromptu demonstration. With horn blowing, this car was driven down a three-story ramp to the street, then circled about the plant while 11,000 men, off the job for a month, cheered.

Open-Hearth Operators Meet at Birmingham

(CONTINUED FROM PAGE 31)

Mr. McKimm mentioned a few characteristics of slags obtained from subject heats. He was personally not very strong for routine slag analysis, but believes in establishing a good practical steel-making procedure and very carefully supervised metallurgically. Every month the slags should be analyzed, and when definite changes have taken place the efficiency of a given change should be checked. Above all, make steel and consider slag analyses merely as research, not as operating routine. His company does, however, run total FeO on its slags.

Mr. McKimm stated that he has found by a well controlled practice that quality remains constant and the monthly slag from each furnace changes little. With the low iron charge FeO is generally 21 to 23 per cent (Fe_2O_3 reduced); SiO_2 is generally 12 to 14 per cent; phosphorus in the metal at time of the slag test in the bath is 0.020 per cent and always finishes 0.007 to 0.009 per cent. If the SiO_2 in this case shows 15 per cent, the final phosphorus starts to increase to 0.012 to 0.015 per cent, and, at 17 per cent SiO_2 , the phosphorus and sulphur become an issue and steel quality becomes inferior, which results in an increase in final rejections.

The practice of final deoxidation that Mr. McKimm has found to yield the best ingot, that is, a well shaped heat, is as follows: the manganese is maintained between 30 and 40 per cent, preferably below 35 per cent; the aluminum is considered as medicine and is added in very small amounts, in fact, such small quantities as to permit the steel to be more on the oxidized side than is usual practice. The best aluminum practice is to add a slight deficiency to the ladle so that some aluminum can be added to the mold, varying from a few pellets to 2 or 3 ounces per ingot (not usually more than $1/3$ to $1/6$ oz. per ingot ton). It is always kept in mind that the steel is wanted on the dry and bony side, but, of course, extremely close supervision

is required or the ingot will be too dry. The mold aluminum is advisable, as better control of rimming action can thus be maintained, and all ingots consequently will be alike. Often an ingot does not begin immediate action after the shutoff, whereas a few pellets will cause vigorous action to start as soon as the stream has been shut off. The aluminum practice must necessarily conform to other factors, because a change in the charge or refining procedure will change the requirements. In properly made steel, a proper use of aluminum control will result in every heat yielding identical ingots. However, as long as the steel is maintained on the dry side, close control is essential—but operators may slip too far in this direction, and the ingots may be so dry that difficulty in heating and rolling will result.

In discussing ingot mold coatings, Mr. McKimm said that the proper care of ingot molds is of utmost importance. The molds should be used until steel quality shows some evil effects, whether it be only 10, 50, 100 or more heats old.

Coatings for the mold wall surface have often been mentioned, but it is quite evident that the type of mold wash is not so important. Of first importance is a properly designed mold for the grades of steel to be made, and, secondly, a mold wash that puts a coating on the wall. After experimenting with standard high grade graphite, tar dip, tar spray and specially prepared solutions, he found that graphite with a siliceous binder to be the best. With straight graphite, the molds were usually merely sprayed with dirty water, inasmuch as all the graphite had settled; however, with a binder the graphite had a greater ability to remain in suspension, and a good coating was always obtained. The binder can be so controlled as to give any degree of hardness desired. It is important to have sufficient hardness to impart a good body to the coating, but if it is too hard it will in

time cause deterioration of the mold wall surface and thus will shorten the mold life. As the metal splashes on this type of coating, it runs off in a manner similar to water off of an oily surface. Very few scabs will be encountered. Of course, scabs often result from causes other than splashing, such as careless furnace practice or even because of bad iron. That is, where heats have had a heavy bottom or bank action, either due to improper care of the bottom or due to furnace operation promoting such action or even due to the iron itself, a long time check will show an increase in scabs of such heats over those not having such trouble.

Fundamental Principles Of Metallic Corrosion

(CONTINUED FROM PAGE 43)

can give considerable protection even when they are not continuous. On certain specimens, scratch lines were ruled through the aluminium coating, so as to lay bare the steel. On exposure, a little rust appeared in the scratches at first, but rusting soon ceased to develop and after five or six years was quite inconspicuous, although uncoated steel specimens suffered actual perforation in about five years. There seems little doubt that cathodic protection comes into play at breaks in the coat. This matter is important, because the sprayed coatings are rather porous and have been considered in some quarters too soft for certain purposes, so that the possibility of accidental scratches in service cannot be overlooked. As a matter of fact, the coatings form a good basis for many other forms of protective layers, and for purposes where sprayed metal would be regarded as mechanically unsuitable, another material with better wearing properties could, in many cases at least, be applied upon it.

Actually, it will often be desired, for decorative or other purposes, to apply paint upon an aluminium sprayed surface and accordingly in the test mentioned, specimens which carried coatings of paint, both red iron oxide paint and chromic oxide paint applied upon the aluminium were included. These

paints have retained their appearance far better than those applied directly to the steel surface, illustrating how, as often happens in practice, paint films may be disrupted by rust forming underneath them before they have been seriously affected by changes starting at the outer surface.

The application of sprayed metal coatings is limited by the careful preparation of the steel surface which is essential if satisfactory adhesion of the coating is to be achieved.

Since many materials, notably stainless steel and aluminium, owe their stability to oxide films, it is rational to try and produce artificially protective films of oxides or mixtures of oxides. Mixtures containing chromic oxide have been found useful. Thus aluminium, magnesium and zinc alloy are often treated in baths containing chromates and other salts.

The use of baths which leave protective phosphate layers on metal before the application of paint or enamel is already widespread. Although in general these coats by themselves give only limited protection against corrosive conditions, yet paint applied to metal bearing a phosphate coat gives far better protection than paint applied to an untreated surface, because incipient corrosion under the paint, which is the most frequent cause of early paint failure, is prevented or at least postponed. It is thought that these processes should not be used for surfaces to come into contact with acid liquids, but for an ordinary corrosive atmosphere, a phosphate treatment before painting will generally greatly improve performance.

The use of phosphate or phosphoric acid before painting falls into three main groups. The first, for the removal of mill-scale from structural steel in hot phosphoric acid so as to produce a surface suitable for the application of paint. This avoids the underrusting which sometimes follows pickling in hydrochloric or sulphuric acid. Secondly, the treatment of an already descaled surface in a hot bath containing phosphoric acid usually saturated with the phosphate of iron, manganese or zinc so as to produce a protective phosphate film upon which a coat of enamel is usually applied and thirdly, treatment in phosphate baths intended to avoid the neces-

sity for descaling, and allow paint or enamel to be applied safely to a surface, which otherwise would constitute an unsatisfactory basis for paint. There are several of these processes in commercial use in Great Britain. In one patented process, the Electro-Granodine process, the articles are dipped for four minutes in a phosphate bath through which an alternating current is passing.

The employment of colloids as inhibitors has a special interest. Today, the best known application of colloid inhibition is the use of these bodies in pickling baths. The colloids not only reduce the consumption of acid, but diminish the embrittlement caused by hydrogen entering the metal and the blistering produced where it is evolved below the surface. Furthermore, they diminish the roughening of the surface through local attack upon the metal and reduce and, it is understood, the subsequent cost of grinding and finishing.

It is possible to stop the electrochemical corrosion of iron by adding to the corrosive water a substance which stifles the anodic or cathodic reaction. If an alkali or a phosphate is added to soft water, the anodic reaction is stifled, because the anodic product is a sparingly soluble body, an iron hydroxide or phosphate. In this way corrosion can be prevented altogether, the iron remaining bright indefinitely. If the water is saline, the amount of inhibitor is increased. If the quantity added is insufficient, the total corrosion is reduced, but the corroded area is also reduced and usually in greater degree, so that the intensity of the attack may actually increase. Clearly such inhibitors may be dangerous, since, if the quantity required is misjudged, corrosion is intensified, and perforation of the metal walls of the containing vessel may occur more quickly than if no attempt had been made to doctor the water.

If alkali is added to hard water rich in calcium bicarbonate, so that the water is rendered saturated with calcium carbonate, then incipient corrosion will throw down a chalky film on the cathodic zone and tend to stifle the cathodic reaction. In such cases, there is generally no danger of the intensification of the attack, at least in cold water systems. However, the cessation of corrosion caused by a

cathodic inhibitor is less immediate and less complete than that produced by an anodic inhibitor, and the fact that cathodic inhibition often produced a perceptible layer on the metal may reduce the heat transfer of a thermal system.

There are a large number of methods likely to become available in suitable cases for reducing corrosion troubles. Some of these are still in the laboratory stage, others are commercially developed but comparatively little employed. The usual objection to employing any particular method is that the first cost is considerable, and it is recognized that if the process is completely successful, the ultimate saving would greatly exceed the original outlay, but, whereas the first cost is certain, the ultimate saving is problematical. In view of the fact that in certain cases protective methods may aggravate the trouble, when wrongly used, it is difficult to blame an engineer who refuses to alter his existing methods, even when they are not wholly satisfactory.

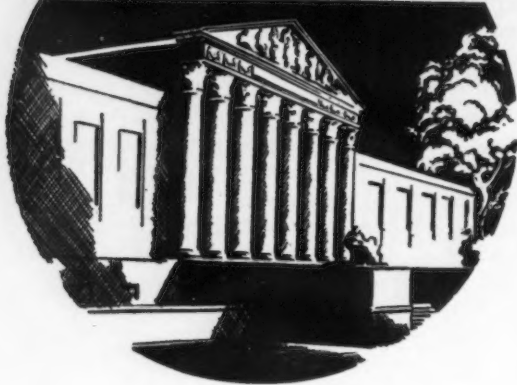
Real Wages Highest In History

AMERICAN factory wages, in terms of buying power, are higher today than ever before in history, according to a statement by John W. O'Leary, president of the Machinery Institute, in connection with the publication of an institute pamphlet, "Technology and the American Consumer."

The average factory worker today is 6 per cent better off than he was in 1929 and about 46 per cent better off than in 1914, according to wage and cost of living indexes compiled by the National Industrial Conference Board, Mr. O'Leary said. Real weekly wages in 1937 have been above 113 per cent of the 1923 average, whereas in 1929 they were 107.2 and in 1914 they were 77.8.

In addition to reporting the relation of factory wages to general living costs the pamphlet shows that prices of 20 widely used machine-made products measured in buying power of factory wages are 63 per cent lower today than in 1914. "Technology and the American Consumer" is the fourth pamphlet of a series based on a study of the relation of industrial mechanization to the American standard of living.

WASHINGTON.



... Supreme Court decision on Wagner Act leaves door open for legislation that will make labor equally responsible with industry for law violations.

. . .

... Moves are being made to re-open the Wagner Act—Labor leaders oppose compulsory arbitration or incorporation of unions.

. . .

... Federal control over wages, hours, etc., likely to be embodied in bills to be introduced at this session of Congress.

By L. W. MOFFETT

*Resident Washington Editor,
The Iron Age*

. . .

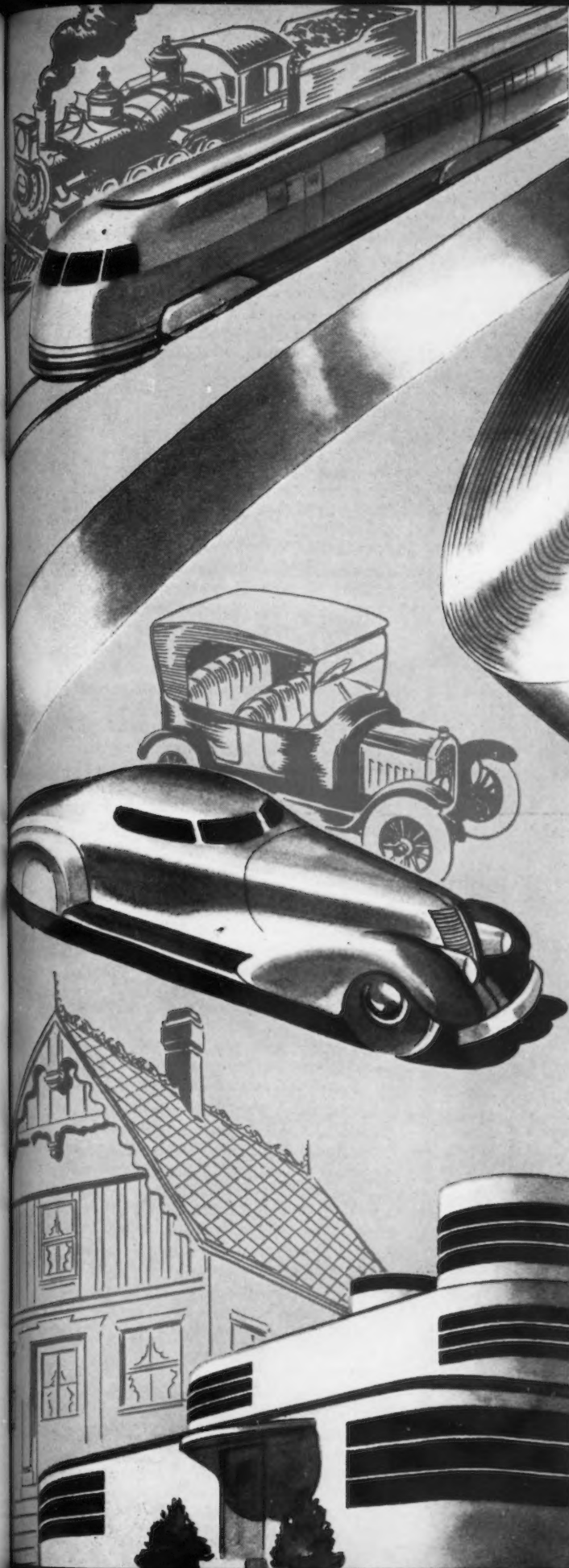
WASHINGTON, April 20.—Rejoicing in New Deal and organized labor circles over the historic decisions of the United States Supreme Court upholding the validity of the National Labor Relations Act has been tempered by the emphasis laid by the court on the power of Congress over labor relations. For while the decisions, notably in the Jones & Laughlin Steel Corp. case, broadly liberalize the commerce clause of the Constitution and give the Federal Government wide control over manufacturing industries, they also charge Congress with broad control over labor where it obstructs the flow of interstate commerce. In consequence the administration and Congress, heretofore extremely cautious of any legislative enactment displeasing to labor, now are faced with the ticklish problem of making it equally responsible with industry for violations of the law.

Industry has been quick to seize

upon the principles set forth by the Supreme Court and will demand that legislation growing out of the decisions require that labor, as well as industry, accept its full responsibility. Already moves are being made to reopen the National Labor Relations (Wagner) Act, now altogether one-sided in favor of labor, to be corrected so that it will protect the public by exerting "equal control over both parties" to labor disputes. This note, sounded by James A. Emery, general counsel of the National Association of Manufacturers, in an address last Friday before the annual meeting of the West Virginia Chamber of Commerce at White Sulphur Springs, W. Va., has been raised throughout industry. It will be one of the chief subjects of discussion at a meeting here this week of the board of the N.A.M., when it analyzes effects of the Supreme Court decisions. It will also be given prominent attention at the annual meeting of the Chamber of Commerce in Washington beginning April 26.

The proposed extension of the Wagner Act is also being discussed

by industrial interests with a view to enlarging the membership of the National Labor Relations Board so that instead of having labor representation only as at present it would also have industry and Government representation, the latter to represent the public. Such legislation at the present session of Congress is improbable, if it is enacted at all, but it is clear that it will be strongly pressed for passage. It is plain, too, that industry is not satisfied with the present board set-up, with its decided pro-labor leanings and will seek not only to have it enlarged so as to be balanced between labor and industry, but already, in view of the Supreme Court decisions, the board is being called upon to recognize the rights of employers. Indicative of this development is the demand that the NLRB call an election to determine which of the unions of the radio operators on the International Mercantile Marine Lines have majority representation for the purposes of collective bargaining. The board has previously shied away from participating in jurisdictional disputes between rival labor unions, claim-



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ing it had no power to do so, though the claim is widely challenged. It can no longer decline to take a stand, according to legal authorities who say any doubt on the subject has been removed by the Supreme Court decisions.

Organized labor itself has shied from use of its own Wagner Act when it knew that elections would show it in the minority and thus would interfere with its headlong organizing activities. The outstanding example of this attitude was that taken by John L. Lewis' Com-

mittee for Industrial Organization in connection with its drive in the steel and automotive industries. If Federal authority over labor is exercised as granted by the Supreme Court decisions, labor unions will have to come to law and prove their right of collective bargaining as the majority labor unit in industries. Furthermore, instead of being able to disregard state and local court authorities, they will face Federal court action for violations, including the sit-down strike, a CIO technique which its rival, the Amer-

ican Federation of Labor, has shrewdly condemned.

To Make Unions Responsible

Making labor responsible for law violations centers around two principal points: Compulsory arbitration of industrial disputes and compulsory incorporation of labor unions, both of which are strongly opposed by Lewis and President Green of the A. F. of L. Senator Wagner, chairman of the Committee of Education and Labor, co-author of the Wagner Act, is prepared to lead a fight against such amendments. Lewis, commenting on plans to make labor unions incorporate, said that such legislation would destroy unions. He declared that employers who deal with unions are not required to incorporate. The purpose of incorporation, he said, is not to produce "responsibility," but rather is intended to limit liability. Compulsory labor union incorporation, Lewis insisted, would make it possible for employers to plant "provocateurs" in some obscure "local" to incite violence and as a result lay ground for suits against the national organization. Commenting on proposed legislation to outlaw sit-down strikes, Lewis said that it is unnecessary. The proper way to outlaw sit-down strikes, he said, is by agreements between unions and employers, but he failed to add that such agreements have been violated by his unions. Mr. Lewis also made it known that the CIO has its fingers crossed on the sit-down strike situation, with a leaning to hold on to trespassing as a means of enforcing its demands, and a fear to order it stopped. He was asked if the sit-down strike would be abandoned now that the Wagner Act has been validated by the Supreme Court.

"I wouldn't say so at this time—no," Lewis said. He made no bones of the fact that it is the purpose of the CIO to impose the closed shop on American industry.

Nevertheless, while taking this hard-and-fast stand against labor union incorporation, compulsory arbitration and assuming an ace-in-the-hole position toward the sit-down strike, Lewis and other CIO leaders, as well as A. F. of L. leaders, apprehensive over moves to restrict labor activities, have come out with statements designed to mollify public resentment against growing labor troubles. Lewis has belatedly stated that it is necessary for both labor and industry to undergo a period of "cooling off" after the tense labor situation of the past six months, highlighted by sit-down strikes of CIO-controlled unions. While Lewis will make no promise to abandon the sit-down

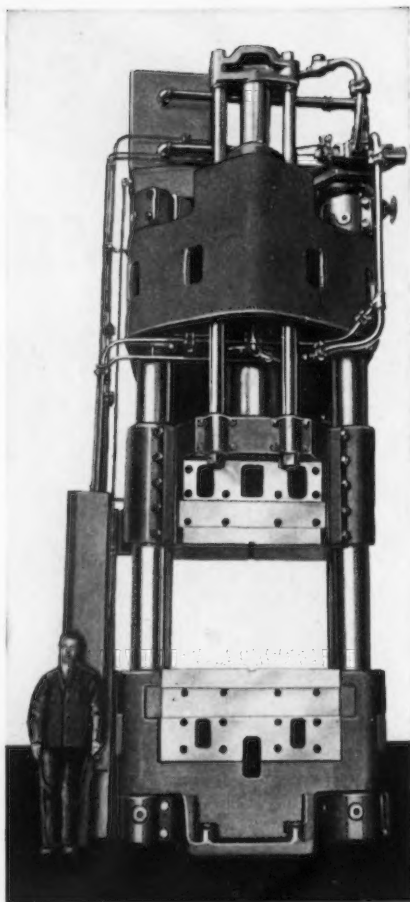
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strike, it is evident that he is concerned over it because the movement has gotten out of his hand. He would like to find another means of effectuating his organizational drives. He said that "It is an equal responsibility on the part of both sides (labor and industry) to have their agents cooperate in the logical administration of a contract and to quell those irresponsible individuals who by their acts would destroy collective bargaining." It is exactly the attitude of those industries which have faithfully recognized the right of collective bargaining that the sit-downers have disregarded such right and insisted upon their own right of trespass to enforce their demands.

Laws to Regulate Industry

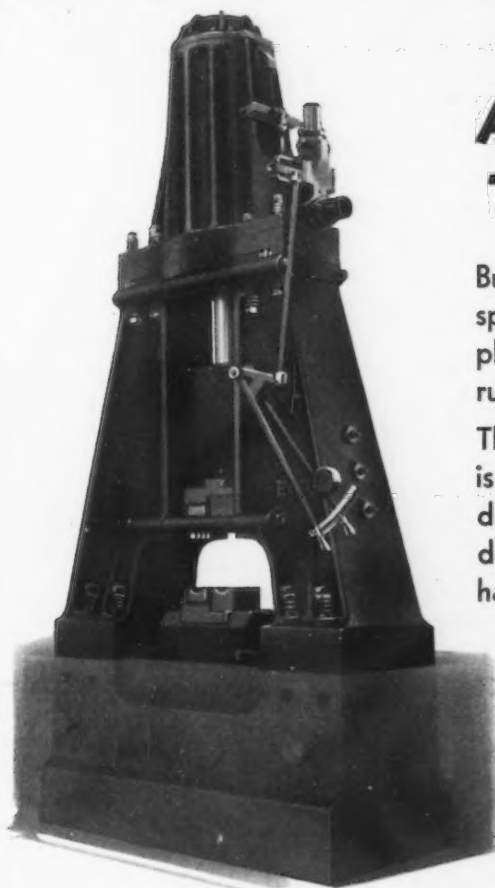
Turning to administration legislation to regulate industry, a la NRA, as the result of the Supreme Court decisions, there is no question but that the New Deal will ask for such legislation at the present session of Congress. Administration leaders, such as Senator Robinson, have definitely said it will be offered. But it is evident that the administration has not determined just how far it can go and until it has reached conclusions in this direction, and pending action on the Supreme Court-packing plan, it is not expected to submit legislative drafts to Congress. Administration sources, ever ready to criticize the Supreme Court, regardless of the character of its decisions, now are complaining that the decisions only covered the right of collective bargaining, leaving untouched—and it had no right to touch them—such questions as maximum work hours, minimum wages, child labor, etc.

So administration legal lights and others are studying the decisions in order to see how far they may proceed in the way of establishing Federal control over hours, wages, child labor, etc. For it is definitely the desire to inaugurate a Federal bureaucracy, smacking in many respects of the NRA, but perhaps less elaborate. Service trades, for instance, likely will be left out, for it is clear from the Supreme Court decisions that they cannot be subjected to Federal control.

One plan said to be under contemplation is to adjust flexible hours and wages in all industries engaged in interstate commerce within the broad terms of the Supreme Court decisions. The underlying purpose of adjustable hours and wages is said to be to so regulate them that the highest efficiency in production, coupled with the best interests of labor as to working conditions, income, and employ-

ment, will be served. To a degree this proposal, which may be only under tentative consideration, fits in with the high production philosophy of Governor Marriner Eccles of the Federal Board and also the report made by a committee on the NRA. At the same time the idea of hours and wages in industry periodically adjusted by a button-pushing board in Washington has been criticized as being wholly impracticable and one that would be extremely confusing in its prospects.

Because of the manifest effort to establish Federal control, less importance is being attached to the growing number of measures in Congress providing for state control of wages, hours and labor conditions, with Federal support. More importance is being given to such bills as that of Representative Ellenbogen of Pennsylvania. Emerging from a prolonged hibernation, the bill has made its reappearance with volumes of other proposed regimentation legislation, since the Supreme Court gave its blessing to



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the Wagner Act. The Ellenbogen bill would set up a little NRA in the textile industry, just as the recently enacted Guffey-Vinson coal act sets up an NRA in the bituminous coal industry. These measures are pointed to as evidence that the administration legislation may take the form of setting up NRA's for interstate commerce industries rather than blanketing them under one law as was done under the im-

possible and invalidated National Industrial Recovery Act. But that the administration definitely has such a purpose in mind is questionable. Representative Kent Keller, Democrat, of Illinois, chairman of a subcommittee of the House Committee on Labor, has called hearings on the Ellenbogen bill, beginning May 1. Meantime hearings were begun today before the House Committee on the Judiciary on the

bill of Representative Howard W. Smith, Democrat, of Virginia, to fix wages, hours and labor conditions in industry under state control, enforced by the Federal Government. Mr. Smith has directed letters to every member of the House urging support of methods of state control with Federal aid which would apply to interstate commerce in prohibited articles not covered by the recent decisions of the Supreme Court. Mr. Smith said the recent decisions have opened the way to enforce state laws relating to the AAA, minimum wages, collective bargaining, child labor, etc., supplementing previous Supreme Court decisions upholding state laws barring prison goods, etc.

Favors Legislation on Hours and Wages

While Chairman William P. Connery, Massachusetts, of the House Committee on Education and Labor, said he was not opposed to the Smith bill, he pointed out that he is awaiting White House advice before taking any steps for hours and wage legislation. Mr. Connery said he favors general Federal legislation covering hours and wages, expressing this view after a recent conference with James Roosevelt, executive assistant to the President. The Labor committee chairman indicated that he had been encouraged to delay such legislation until after the court reorganization proposal is disposed of—which may mean a long wait indeed.

Senator O'Mahoney, Democrat, of Wyoming, always eager to push forward his bill to compel Federal incorporation of industry, to be granted licenses only upon agreement to standard hours and wages, has come forth again with his measure as an answer to the Supreme Court decisions.

To show the confusion as to whether wage and hour legislation may be constitutionally enacted, it is only necessary to point to the observation of Senator David I. Walsh. Like many other members of Congress, he is not convinced that the Supreme Court decisions "are broad enough to bestow upon Congress, without a constitutional amendment, powers to fix maximum hours and minimum wages in all industries." The Massachusetts Senator said he saw nothing in the opinions to indicate reversal of the NRA invalidation decision. He declared that the decisions clearly state that authority of the National Labor Relations Board is limited to facts in each case and that there must appear something more than a productive industrial organization which only indirectly or remotely

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enters into interstate commerce. It seems clear, he added, that the larger, national industries must conform to the Wagner Act, but beyond these he does not think the Federal Government could fix maximum hours of employment and minimum wages.

Senator Wagner, jealous of his own law, does not think further legislation dealing with labor is now needed. Representative Connery, joint author of the Wagner Act, holding a contrary view, said it might be found feasible to proceed first with individual industries, such as has been done in coal. If this procedure is adopted, he suggested that measures affecting such industries as steel and automotive eventually might be considered—two basic industries which distinctly have short work weeks and wage standards adapted to the terms of organized labor. Further labor legislation is offered by those who fear it will impose restrictions on labor. However, there is doubt in actual absence of a program, that the administration will offer any legislation that is distasteful to labor, despite demands of industry.

Rivet Makers Cited For Price "Agreement"

WASHINGTON, April 20.—Thirteen companies and their trade association, the Institute of Tubular Split and Outside Pronged Rivet Manufacturers, Waupun, Wis., are charged in a Federal Trade Commission complaint, announced yesterday, with an unlawful agreement to suppress competition and to create a monopoly in the sale of industrial rivets in violation of Section 5 of the Federal Trade Commission act. The commission said that while the companies do not manufacture the type of rivet used for heavy construction work, they are said to constitute a substantial majority of all manufacturers of industrial rivets in the United States.

For the purpose of making effective their alleged agreement, the respondent companies, acting in cooperation with each other and with the institute, are alleged to have engaged in certain practices, as follows:

Fixed and maintained uniform delivered prices for industrial rivets sold by them; induced certain of the respondent companies, by intimidation and persuasion, to raise their quoted prices to the uniform delivered prices fixed under the agreement; held meetings of the institute, its members and

officers, to devise methods and means of requiring manufacturers and producers of industrial rivets to establish and maintain prices and to fix the established and published prices as well as to abide by such uniform price lists so fixed.

According to the complaint, the effects of the agreement have been to monopolize in the respondents the business of manufacturing,

dealing in and distributing industrial rivets; to lessen and restrain competition in the industry, and to deprive the purchasing and consuming public of the advantages in price, service and other considerations they would receive under conditions of normal or free and fair competition.

The respondent companies are: Shelton Tubular Rivet Co. and Shelton Tack Co., both of Shelton,



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The respondents are allowed 20 days from service of the complaint.

The Refrigerating Machinery Association will meet on May 12 and 13, at Hot Springs, Va.

Walsh-Healey Act to be Broadened And Clarified by Two New Bills

WASHINGTON, April 20.—Senator Walsh and Representative Healey, both of Massachusetts, last Thursday introduced identical bills which would broaden the scope of the Walsh-Healey Government Contracts Act. The bills follow and

expand the amendments which were outlined in THE IRON AGE of April 15, page 93, proposing a boycott of firms which do not comply with the National Labor Relations Act. Under the terms of the Walsh-Healey bills the present minimum of \$10,000 on Government contracts, now exempt under the Walsh-Healey act, would be reduced to \$2,500, services as well as supplies would be included, and an ineligible list of bidders who "persistently" violate the National Labor Relations Act would be created, in order that all bidders would be required to guarantee the right of collective bargaining. Requirement also would be made that dealers' bids contain certificates that supplies for the Government are produced in accordance with the labor terms of the act, and contractors permitting contracts being performed in the home of workers would be barred from bidding.

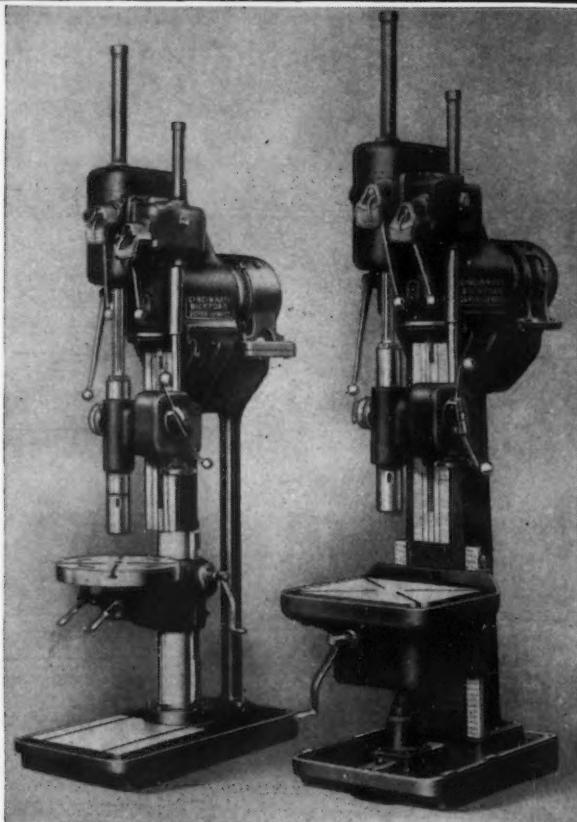
Clarifying language is offered for wage, hour, child labor and convict labor provisions of the act, but otherwise they remain substantially unchanged. The moot "open market" provision also is clarified for the benefit of Government departments which purchase in the open market, without the necessity of public bidding, to get supplies quickly.

The basic 40-hr. week would be left unchanged but its regulation would be relaxed so that contractors might allow for compensating time off and for days in which operations last more than 8 hr., without payment of additional overtime, provided the aggregate work-week does not exceed 40-hr. The steel and other continuous industries apparently would be subjected to somewhat less rigid regulations under this provision than at present.

Amendments affecting dealers are offered to remedy what are said to be present defects of the act by which some dealers are reported to have evaded the law by purchasing materials from plants not conforming to the act, storing the goods in warehouses and selling to the Government. Dealers under the proposed bills would be required to furnish certificates stipulating that materials were produced in accordance with the labor conditions of the law. The amendment, however, would not cover intermediate manufacturers shipping raw materials or parts to

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a producer who has a Government contract, according to Mr. Healey. Nor does it make a contractor responsible for policing labor conditions in the plants of other employers. The purpose is to place responsibility for adherence to the labor provisions with the manufacturer who is directly furnishing supplies to the Government. Making services also amenable to the act, however, means that erectors of Government buildings and others performing services in connection with Government contracts would come within the terms of the law.

For the purpose of clearing up the definition of the term "minimum fair wage," an amendment would permit the averaging of different minima in industries where there is no single prevailing standard. The amendment would, it is contended, clearly carry out the intent of Congress by preventing the wage standard paid in one area with the highest cost of living, from becoming the wage standard for the country as a whole, since the change proposed would allow each industrial section to be weighted according to the number of its employees in the minimum classification.

Japan Puts Steel On Free List

WASHINGTON, April 20. — Effective at once, most iron and steel products imported into Japan have been placed on the free list, according to a report received from Tokyo by the Bureau of Foreign and Domestic Commerce, which said that action was taken by Imperial ordinance, which will continue in effect until March 31, 1938. Items not included in the free list, generally speaking, are tubular products and "special steels, consisting mostly of alloy products."

Inspectors to Discuss Welding Problems

WELDING of high tensile, low-alloy steels, welding of power plant piping, non-destructive testing of welded pressure vessels and general problems in the repair by welding of boilers and pressure vessels and pipe lines are among the topics planned for the eleventh general meeting of the National Board of Boiler and Pressure Vessel Inspectors, to be held May

24-26, at the Hotel McAlpin, New York.

Other subjects planned for the meeting include: Use of ferrous and non-ferrous alloys in the construction of pressure vessels; latest developments of steam generating plants; design and testing of safety valves, and developments of forced circulation boilers.

Also, water problems in high-pressure boilers, welding of high-strength copper alloys, and operating problems of modern large

steam generating units. The general problems of welding in the light of today's experiences and the necessity of maintaining high standards for welded vessels will also be discussed.

A special committee has prepared an exhibit which will include examples of sound and defective welding, examples of failures experienced in operation and examples of new construction and design of boilers and pressure vessels.




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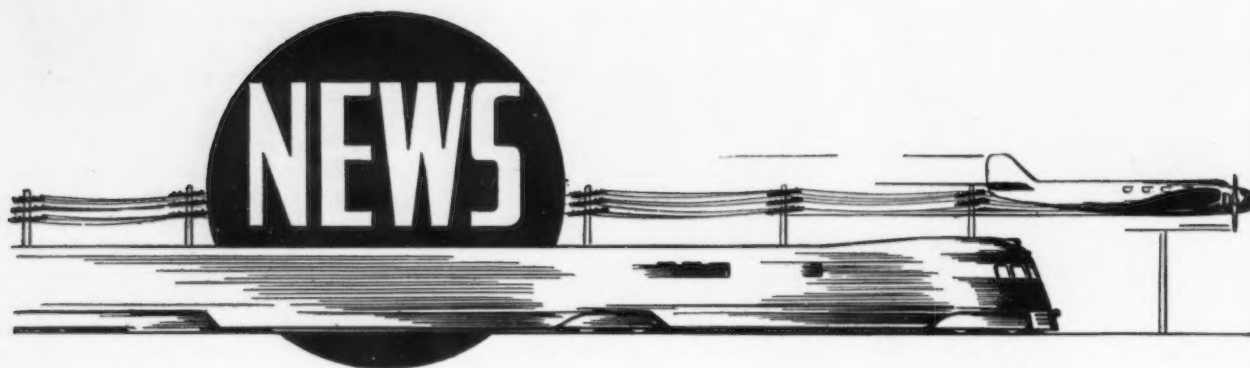
"A.W."-"70-90" rendered 20 new New York City refuse trucks lighter and stronger.

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Scrap Institute Splits Over Question of Scrap Exports

A DIVISION of opinion over the question of scrap exports at a meeting of the board of directors of the Institute of Scrap Iron and Steel at Canton, Ohio, resulted in the resignation of Darwin S. Luntz, president, and three members of the board of directors, W. J. Ross, Hyman-Michaels Co., Chicago, A. M. Price, Price-Watson Co., Chicago, and Maurice Friedman, M. D. Friedman Co., Ashland, Ky. Mr. Friedman also resigned as president of the Cincinnati chapter.

Ten of the directors voted in favor of opposing legislation which would license exports of scrap, and six voted in favor of at least a quota agreement with the mills. It was understood that these latter took the position that American mills should be given first consideration.

The Institute of Scrap Iron and Steel elected Michael V. Bonomo, Schiavone - Bonomo Corp., New York, to succeed Mr. Luntz as president of the institute. Mr. Bonomo has been vice-president.

The Independent Steel and Iron Producers Committee on Scrap has issued the following statement:

"Recent statements in the press carry the suggestion that the Independent Steel and Iron Producers Committee on Scrap will abandon their effort to obtain legislation licensing the export of scrap.

"No such view is warranted as the committee on scrap, backed by

over 300 independent rolled-steel, gray iron, cast steel and malleable iron producers, is firmly convinced that the situation can only be handled in this manner.

"News has already reached the committee of advances having been made to men formerly in the scrap business, offering to finance them in setting up new yards. These offers were claimed to have been made by representatives of foreign countries. Even the thorough cooperation of the scrap dealers themselves would be no guarantee of controlling this export of our natural resources. Only legislation can control it."

Scrap Licensing Legislation Is Being Studied by Government

WASHINGTON, April 20.—Legislation to license exports of iron and steel scrap still is being studied by the Interdepartmental Commercial Policy Committee. The committee is making a study of the proposed

legislation at the request of Senator Lewis B. Schwollenbach, of Washington, who has introduced a licensing bill in the Senate. A like measure has been introduced in the House by Representative H. P. Koppleman, of Connecticut. The

NEWS AND MARKET INDEX

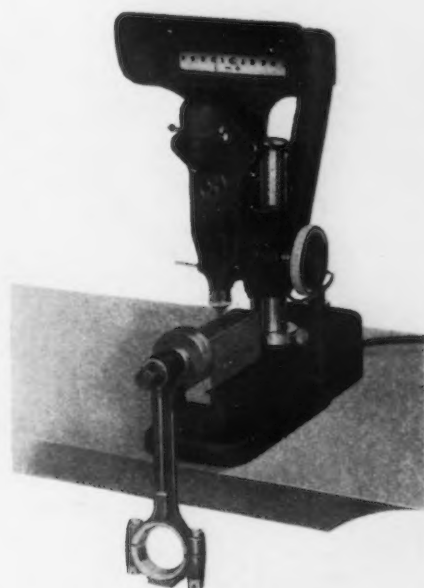
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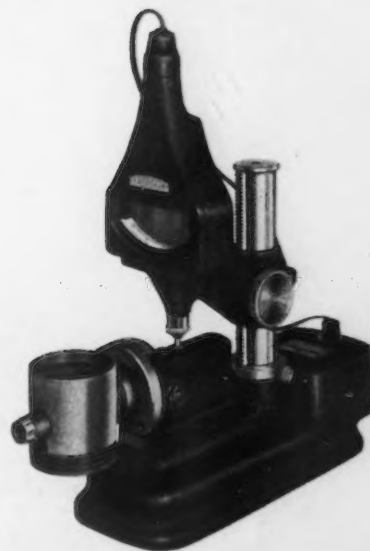
an inch. • The Sheffield Internal is furnished for holes of all sizes up to 6 inches in diameter. The length of the gaging nose is designed especially for the individual application. • Ask for quotation on any specific application accompanying your request with parts drawings.



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bills have been referred to the Military Affairs committees of each branch of Congress.

Upon receipt of reports from the Interdepartmental Committee, the Senate Committee proposes to hold hearings when witnesses for and against the legislation will present their views.

The bill as now drawn will be redrafted to include all Bureau of Standards classifications. As now drafted, it is a copy of the tin

plate scrap export act, except that it eliminates the word "tin" and substitutes the word "steel" so that it covers only steel plate scrap, obviously too limited to meet the purposes of those steel producers who want exports of old material cut down.

Meantime, the high price and the reported shortage of scrap have been assigned as the reason for a recent order of Assistant Secretary of the Navy Edison prohibiting

Navy Yards from selling scrap. The old material the Navy produces will be conserved for use by its own foundries and open-hearth furnaces.

Proponents of the proposed legislation say the foreign demand for scrap from the United States shows no signs of let-up and that much of it is wanted for armament purposes. Shipments to the Atlantic and Gulf ports, it is declared, had become so heavy that the railroads have applied far-reaching embargoes, stretching from Portland, Me., to Galveston, Tex., refusing to take shipments unless ship space is immediately available for exportation. And with the railroads tightening up on acceptance of old material for shipment abroad vessel space is becoming scarcer as rates mount. Despite these precautions against scrap accumulations, it is reported that they have piled up in large quantities at Atlantic and Gulf ports, amounting to some 2200 cars between Portland and Galveston, which await exportation. Estimating 40 tons to a car, this would be 88,000 tons at the ports tied up until ships are available to take on the cargoes. At Savannah, Ga., it is said, were recently 328 cars of scrap on cars with 15 to 20 cars arriving daily, while some 75 cars are reported to be awaiting vessel loading at Jacksonville, Fla., with like amounts at Mobile, Ala., and Panama City, Panama. Three steamers each loading about 5000 tons of scrap, were reported the latter part of last week to be en route to Savannah to take on cargo at that port.

The great part of the tonnage is said to be for shipment to Japan, which is feverishly scouring the world for scrap. Indicative of Japanese eagerness, it is reported that they have said if they thought American licensing legislation would be enacted, they would pay up to \$35 a ton for scrap. Early last week Japanese buyers took 5500 tons of scrap in the steamship Los Angeles, which they also purchased in the United States and will junk for its scrap value when it reaches Japan.

Iron and steel scrap (exclusive of tin plate scrap) exports in February totaled 143,197 gross tons and for the first two months of the year were 212,081 tons, compared with 296,071 tons in the corresponding period of last year. Those urging licensing, however, say these figures, as relatively large as they are, do not reflect the real magnitude of the movement inasmuch as they do not take

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hack saw machine
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High
Speed
Edge

MARVEL
High-Speed-Edge
Hack Saw Blades

Strictly High-Speed, these patented combination blades are also *positive-ly unbreakable*. They permit greatly increased running speeds, for heavier feed pressures, and can be tensioned much tighter than other blades because the hardened "eyes" in their tough alloy steel body will not pull out.

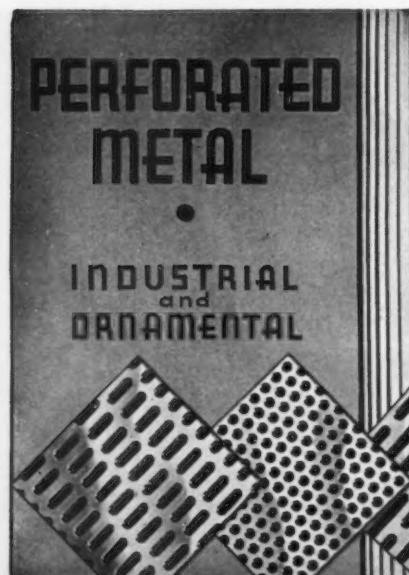
No matter what hack saw equipment you use, you can safely run at *full capacity* with MARVEL High-Speed-Edge Blades.

Write for Circular
ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
347 N. Francisco Ave.

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Tough
Alloy
Body



H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

H & K ornamental designs include standard and many beautiful and exclusive patterns suitable for architectural grilles, enclosures, ventilators, and all decorative uses.

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The
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into account tonnages held up at ports awaiting shipment abroad.

Scrap dealers contend that the scrap situation is overdrawn. They point out that the foreign demand is only a small percentage, about 5 or 6 per cent, of production and that therefore there is no scarcity or threatened scarcity. It is maintained that getting supplies simply is a matter of price, which has risen in response to demand growing out of high steel and foundry operations.

Administration representatives have not publicly indicated their attitude toward licensing legislation. It is reported that some important Government units are opposed to scrap licensing. Some opponents of the legislation fear it would set a precedent which could and might be extended to many products and thus reach proportions that would greatly affect international trade. They also contend the principle of the bill runs counter to the reciprocal tariff program so earnestly sponsored by the State Department.

Scrap dealers have indicated that, if legislation is enacted to embargo their product, they will ask that similar legislation be applied to pig iron and steel.

Carrel Steel Co. to Roll Steel Bars

CARREL STEEL CO. has been formed through acquisition of the Sellers Mfg. Co., Chicago. F. G. Carrel, formerly vice-president and general sales manager of Calumet Steel Co., Chicago, will be president of the new company and M. D. Carrel will be vice-president and treasurer, with offices at 20 North Wacker Drive, Chicago.

The old Sellers plant consists of three 22-in. stands, four 24-in. stands and heat treating equipment. The Carrel Steel Co. will add six 14-in. stands, four 10-in. stands and a continuous furnace. Products will consist of reinforcing bars, merchant bars and track accessories.

Navy Steel Bids

THE Bureau of Supplies and Accounts, Navy Department, will open bids on April 27 for 247 tons of steel sheets for delivery to the Norfolk, Va., Navy Yard for stock.


The supply officer, Washington Navy Yard, is asking for bids to be opened April 22 for 113 tons of pearlitic manganese steel bars of various diameters.

American Brake Shoe Creates New Division

THE American Brake Shoe & Foundry Co., New York, has created a Brake Shoe Division, with Maurice N. Trainer, vice-president, in charge. This division will, in addition to brake shoes,

manufacture certain miscellaneous iron castings. During the past year the company has consolidated the American Forge Co. and the Southern Wheel Co. with the parent company. These are now known as the American Forge and Southern Wheel divisions. Consolidation of certain other subsidiary companies will take place as quickly as practicable.

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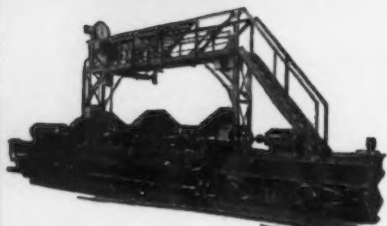
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The Tubing Specialists

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20 Ton Capacity Double Compartment Scale Car for use with Orr type Bin Gates controlled from Operator's Station on Scale Car.

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Recording Scales

Special Cars and Electrically
Operated Cars for every
conceivable purpose.

THE ATLAS CAR & MFG. CO.

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..PERSONALS..

T. P. RILEY, superintendent of industrial relations at the Carnegie-Illinois Steel Corp. sheet and tin mills in Gary, has been transferred to Pittsburgh, where he will serve in a similar position at



T. P. RILEY

the new Irvin works. He will be succeeded at Gary by C. D. HENDERSON, present assistant superintendent of industrial relations. ROBERT A. CRITTEN, who has been foreman in charge of continuous pickling, will succeed Mr. Henderson, and CLIFFORD A. BOUGHNER will become the new foreman of the continuous pickling department.

Mr. Riley began at the Gary sheet mill of the former American

Sheet & Tin Plate Co. as a laborer in 1911. After service as a lieutenant in the United States Army on the Mexican border and infantry captain during the World War, he returned to the sheet mill in 1919 in the galvanizing department. Less than a year later he became employment manager at the sheet mill, and in 1933 was made management's representative for the mill. He became superintendent of industrial relations for the sheet and tin mills of the Chicago district in July, 1936.

Mr. Henderson has been with the United States Steel Corp. subsidiaries since 1906, when he was employed as a clerk at the LaBelle works of the former American Sheet & Tin Plate Co. From 1906 to 1909 he served in a number of positions in the Pittsburgh district, including work as order clerk, special clerk, works auditor at the LaBelle works and special assistant to the auditor in the general offices. He went to Gary tin mill in July, 1927, as assistant works auditor and in 1935 was made management's representative there.

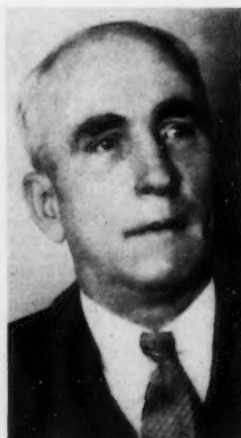
♦ ♦ ♦

L. F. BURRESS has been appointed division superintendent, division of coke plants and blast furnaces, including those at Joliet, Ill., by the Carnegie-Illinois Steel Corp. R. F. CAMPBELL has been appointed division superintendent, division of open hearths and central mills; and R. B. HANCOCK has been appointed division superintendent, division of west mills, including all merchant mills, the 38-in. hot strip mill, wheel and axle mills; all of the above being new supervisory positions established at Gary by Carnegie-Illinois Steel Corp.

Mr. Burress went to Gary works in 1911, from the University of Missouri, starting as heater helper in the coke plant. In 1912 he was



L. F. BURRESS



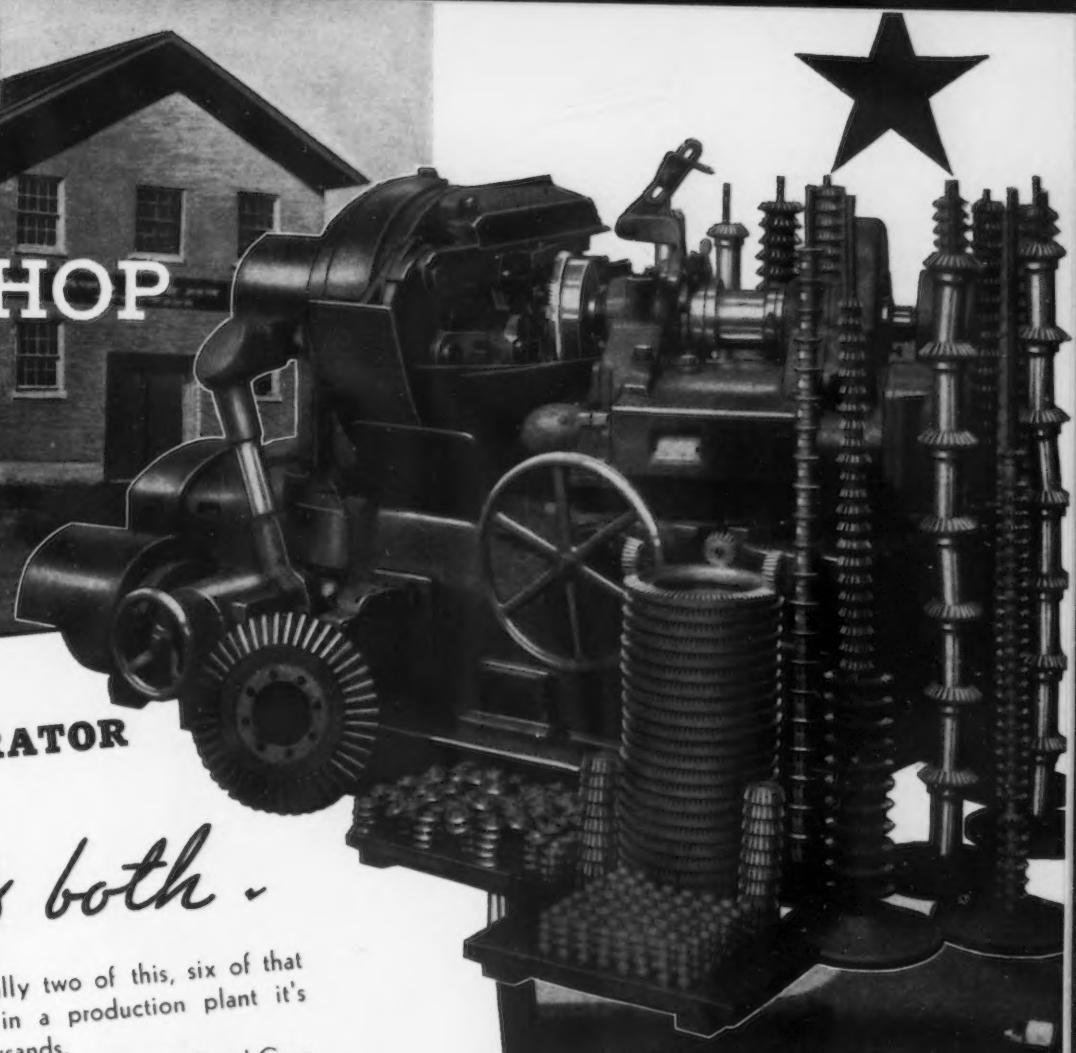
R. F. CAMPBELL



R. B. HANCOCK



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Benefits both.

In job shops it's usually two of this, six of that and ten of these . . . in a production plant it's hundreds and often thousands.

In either type of plant the 12" Straight Bevel Gear Generator will show up to a great advantage because it is so easily and quickly set up . . . equipped to both rough and finish . . . fully universal for bevel gear work . . . and because it produces a very high quality of finish at extremely fast feeds.

Capacity: Gears from the smallest size up to 10 to 1 ratio—24" pitch diameter—3 D. P.—3 1/2" face width.



PRODUCTION PLANT

LEASON WORKS, ROCHESTER, N. Y.

made cooler house foreman. He was appointed superintendent of the by-product department in 1914, and a year later became assistant superintendent of the coke plant. In 1916 he was named superintendent of the coke plant, remaining in this position until 1935, when he was appointed assistant superintendent of Gary works.

Mr. Campbell went to Gary from the Clairton, Pa., plant of the Carnegie Steel Co. in February, 1907, starting as general foreman

in the yard department. In March, 1910, he was appointed assistant superintendent of the No. 4 open hearths, becoming superintendent of the department in March, 1912. Since April, 1930, he has served as superintendent of all open-hearth furnaces at Gary.

Mr. Hancock has been connected with Gary works since 1909, when he went there from Buffalo, and began work as a rail mill roller. He was made assistant superintendent of the merchant mill in 1914, and superintendent of the mer-

chant mill and wheel mill in March, 1918. He was appointed superintendent of the merchant mill, wheel mill and axle mill in September, 1925.

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FRANK J. OLIVER, who joined THE IRON AGE editorial staff on Jan. 1, 1936, as Detroit editor, has been transferred to the home office staff as associate editor and assumes his new duties this week. Mr. Oliver is a graduate in mechanical engineering of the Stevens Institute of Technology, class of 1921. During his college course he had practical work as machinist, tool maker, draftsman and construction supervisor. Following his graduation and until 1926 he did research work for the Edison Lamp Works of General Electric Co. at Harrison, N. J., and engineering design and application work for the SKF Industries, Inc. In 1926, Mr. Oliver joined the editorial staff of *American Machinist*, working through all departments to the Western editorship of that publication and *Product Engineering*.

Mr. Oliver has been succeeded in the position of Detroit editor by William F. Sherman, who brings to that particular work an unusual combination of experience. After graduation from the University of Detroit as an aeronautical engineer and during his college course he was a member of the staff of the *Detroit Free Press* in various reportorial and editorial capacities. He left this work to join the technical data section of the engineering department of the Chevrolet Motor Car Co. As a cooperative student in college he worked in the shops of the Ford Motor Co. He is a member of the Society of Automotive Engineers and the Detroit Engineering Society. As an amateur glider pilot, he is one of less than 200 in the United States who have won soaring pins from the National Aeronautics Association for length of time in the air.

♦ ♦ ♦

ROBERT STOKER, former superintendent of the galvanizing department, Vandergrift, Pa., works of the Carnegie-Illinois Steel Corp., has been appointed to a newly created advisory position in the sheet and strip division of the metallurgical department. His new duties will be to analyze the problems and requirements of the trade in all sales districts of the company. He has been with United States Steel Corp. subsidiaries for 37 years and had been superintendent of the galvanizing department at Vandergrift works from



Production Facilities that give you the widest choice of sizes and shapes including cold drawn extra wide flats up to 12" x 2" . . . *Nationwide Warehouse* service through leading distributors that cuts delivery from days to hours . . . *Metallurgical Service* that helps you solve problems of structure, machinability, tensile strength, hardness and endurance values . . . three of the important factors that make Wyckoff Cold Drawn Steel Service your logical specification.

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General Offices: First National Bank Building
Pittsburgh, Pa.

Mills at Ambridge, Pa. and Chicago, Ill.

Manufacturers of Carbon and Alloy Steels
Turned and Polished Shafting, Turned and Ground
Shafting, Wide Flats up to 12" x 2"

1916 until his present appointment.



D. J. HENECKER, who has been manager since 1934 of the Buffalo district for the Wickwire Spencer Steel Co., New York, has been appointed manager of the wire rope sales department, succeeding the late R. H. Cherry. Mr. Henecker joined the electrical and wire rope sales department of the American Steel & Wire Co. in 1921 and spent over six years in New York and in the South. After returning to New York for a year in the company's wire rope sales promotion



D. J. HENECKER



F. P. CLARK

division, he was transferred to Buffalo in charge of wire rope sales for that district. He came back to New York as assistant department manager of electrical and wire rope sales. He joined the sales staff of Wickwire Spencer Steel Co. in 1932 as assistant district manager at Buffalo, assuming the managership of that dis-

trict in 1934. FRANKLIN P. CLARK succeeds Mr. Henecker as Buffalo district sales manager. Mr. Clark was graduated from the Sheffield Scientific School of Yale University in 1923 and has been associated with the Wickwire Spencer company for the past six years. Before becoming affiliated with the company, he represented the sales and engineering departments of the Good Roads Machinery Co., the United Electric Light & Power Co., Stone & Webster Engineering Corp., and Wagner Electric Corp.

WALTER J. KOHLER, for many years president of the Kohler Co., Kohler, Wis., has been elected to the newly-created office of chairman of the board. He is succeeded by HERBERT V. KOHLER, heretofore executive vice-president. The new board chairman is a former Governor of Wisconsin.



GEORGE S. WHYTE, president of the Macwhyte Co., Kenosha, Wis., manufacturer of wire rope and cable, was tendered a surprise din-

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40 years of expert experience at the controls of the latest model milling machine, turning out a piece of special die work. This man, this machine, are typical of the staff and equipment of the Taft-Peirce Contract Service Department.

HUNDREDS of master machinists at hundreds of modern machine tools—that's the equipment of the Taft-Peirce Contract Manufacturing Department. Here you can have made—to your own blueprints—parts or complete machines and mechanisms—singly, in medium lots, or in quantity. A complete production line can be set up for you—*overnight*. No job

is too large—no job is too small.

These facilities, in whole or part, are at your disposal today, or in any future emergency. Our plant can be annexed to yours in a matter of hours. And this service includes prompt shipment anywhere.

Clip this advertisement *now*. And—whether for immediate or future use—write for full information.

THE TAFT-PEIRCE MFG. CO.

WOONSOCKET



RHODE ISLAND

"TAKE IT TO TAFT-PEIRCE"

ner in honor of his seventieth birthday anniversary on April 10 by the Macwhyte Club, comprising his 350 employees. The signature of each worker was engraved on a bronze plaque with the inscription, "To Our Grand Old Man on His Seventieth Birthday."

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WILLIAM K. CLOW, Jr., formerly general manager of the Henszey Co., Watertown, Wis., has become identified with the technical staff of the Elgin Softener Corp. Elgin, Ill. He will specialize in the field of boiler water conditioning.

E. W. SMITH has resigned as general manager of sales of Pittsburgh Steel Co., Pittsburgh. W. G. HUME continues as manager of sales, wire products and C. V. LALLY continues as manager of sales, seamless steel tubes. The office of general manager of sales will remain vacant. J. K. BEESON, formerly assistant general superintendent of the company, has been made assistant manager of sales. He will have charge of the sale of semi-finished steel, pig iron and rods, and will assist Mr. Hume and Mr. Lally in the sale of wire and tubular products.

G. H. BUCHER, executive vice-president of Westinghouse Electric & Mfg. Co. and president of Westinghouse Electric International Co., has been elected a director of the board of Westinghouse Electric & Mfg. Co. He has been with the Westinghouse company since 1909, starting as a graduate student. In 1911 he was transferred to the export department in New York, and in 1920 was appointed assistant to the general manager of the Westinghouse Electric International Co. In 1921 Mr. Bucher was advanced to the position of assistant general manager; in 1932 he became vice-president and general manager, and in 1934 was elected president and general manager. In 1935 he was elected vice-president of the parent company, and in 1936 he was advanced to the position of executive vice-president.

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R. M. MARSHALL, secretary of the Woodward Iron Co., Woodward, Ala., for the past two years, has also been elected vice-president.

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KARL LANDGREBE, vice-president of the Tennessee Coal, Iron & Railroad Co., has been selected as general chairman of Birmingham's 1937 Community Chest Appeal.

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CARL C. BROWN, formerly general sales manager, Gulf States Steel Co., has been appointed Birmingham district sales manager and ROBERT J. WORKING, assistant district sales manager. W. J. FRAWLEY will continue as sales promotion manager for the Birmingham district.

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DONALD B. GILLIES, vice-president, Republic Steel Corp., was elected a director of the Cleveland Chamber of Commerce at the annual meeting April 13. Among other new directors are A. F. HARVEY, president, Pittsburgh Steamship Co., BEN F. HOPKINS, president, Cleveland Graphite Bronze Co., J. F. LINCOLN, president, Lincoln Electric Co., and C. I. OCHS, president Eaton Mfg. Co. FRED C. CRAWFORD, president, Thompson Products Co., was elected first vice-president.

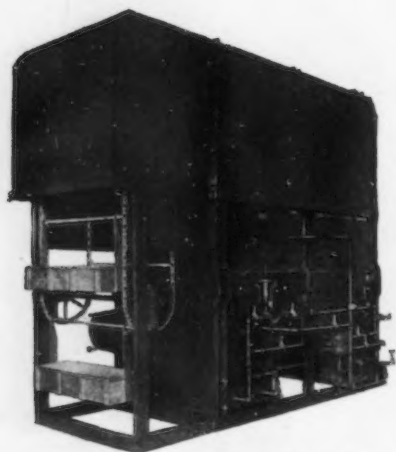
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N. L. VAN TOL, heretofore general superintendent of the Ensley and Fairfield steel works of the Tennessee Coal, Iron & Railroad Co., Birmingham, has been made works manager in charge of all manufacturing operations of the company, with headquarters at the Fairfield steel works. J. M. SPEARMAN, who has been assistant gen-

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For The Metal Finishing Industries

Detrex Solvent Degreasing ...



Completely automatic Detrex Degreaser employing the vapor-spray-vapor method of solvent cleaning. The two-strand, cross-rod type conveyor is designed for loading and unloading at the same end.

A simple, high-speed cleaning process... Used on all kinds of metals... Removes all traces of oil or grease...

Provides a clean, warm, dry surface without muss, fuss, or extra drying operations...

Requires a minimum of manual labor... Insures a low unit cleaning cost...

Available in any combination of vapor, liquid immersion, and hot solvent spray—conveyorized or hand-operated machines.

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eral superintendent at Fairfield, has been appointed general superintendent, and E. C. KAIN, assistant superintendent of the open-hearth department at Ensley, has become assistant general superintendent at Fairfield. A. H. CHALMERS, superintendent, Fairfield coke works, has been made assistant general superintendent of the tin mills. J. J. PHILLIPS, chief operator of the coke works, succeeds Mr. Chalmers as superintendent. DUDLEY VAUGHAN, who has been assistant superintendent of the Fairfield open hearth, is appointed superintendent, succeeding L. C. HENKEL, who has resigned. R. L. BOWRON, assistant general superintendent, Ensley works, has been made general superintendent there and J. A. LOWMAN, general foreman, Ensley open hearth, has been made superintendent of the Ensley open-hearth department.

JOSEPH H. THOMPSON has been elected vice-president and director of M. A. Hanna Co., Cleveland, and has resigned as first vice-president of the National City Bank, Cleveland, to take the new position. R. L. IRELAND, JR., and JAMES PRENDERGAST, directors, have been elected vice-presidents, and C. N. OSBORNE, secretary-treasurer and director, has been named vice-president and treasurer. W. A. MAIER, assistant treasurer, has been appointed assistant vice-president. W. C. SCOTT, assistant secretary, has been made secretary, and H. T. RICHARDSON has been appointed assistant secretary and assistant treasurer.

E. D. LEMAY, who has been identified with the Tennessee Coal, Iron & Railroad Co., since 1911, has been made director of public relations, a newly-created department of the company. He spent nine years, from 1911, in the mining department, and then went to the president's office as secretary to the late George Gordon Crawford, then president of the company. Mr. LeMay served in that capacity until Mr. Crawford went to Pittsburgh, and continued as assistant to succeeding presidents, H. C. RYDING, ROBERT GREGG, and J. L. PERRY. Mr. LeMay was recently awarded a 25-year service medal by the United States Steel Corp.

ALFRED IDDLES, heretofore executive vice-president of United Engineers & Constructors, Inc., Philadelphia, has become associated with the engineering department of the Babcock & Wilcox Co., New York. He is to assist E. G. BAILEY, vice-president in charge of engineering, and will have charge of

application engineering and service work.

ELMER H. NEFF, who recently completed his fortieth year as New York representative, first of the Brown & Sharpe Mfg. Co., and then of the company's New York subsidiary, has retired from active service. For the time being the New York office is under the direction of ARNOLD K. BROWN.

CHARLES RUTLEDGE has been ap-

pointed service representative in the Detroit district for the American Foundry Equipment Co., Mishawaka, Ind. He will make his headquarters at 2918 East Grand Boulevard, Detroit.

D. R. GRANDY has been promoted to the position of assistant sales manager in charge of publicity by the General Electric Vapor Lamp Co., Hoboken, N. J. He has been succeeded as commercial engineer by G. J. TAYLOR.



INLAND 4-WAY FLOOR PLATE Will Make It Safe

THERE are danger spots in every plant, which either cause accidents or slow the movement of men and materials. In either case Inland 4-Way Floor Plate soon pays for itself. Easily and quickly installed, it provides equal protection against slipping in all directions; it drains and cleans easily and withstands hard wear. An illustrated folder showing a wide variety of uses will be sent on request.

SHEETS • STRIP • TIN PLATE • BARS • PLATES • STRUCTURALS • PILING • RAILS AND ACCESSORIES

INLAND STEEL CO.

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Small Steel House to Sell For \$3,000 Erected in New York

A SMALL steel house for demonstration purposes has been built by National Houses, Inc., 280 Madison Avenue, New York, at Riverside Drive and 107th Street, New York. Consisting of five rooms and containing about five tons of steel, this dwelling sells for \$3,000, can be bought on FHA terms, and is to be sold through local dealers, many of whom already have signed up as distributors and are stocking the prefabricated parts from which the houses are assembled. About 500 of these demonstration homes, which are designed for the working man and his family, will be built throughout the country.

Fabricated by the Diebold Safe & Lock Co., Canton, Ohio, the panels are of 16-gage steel, 9 ft. high and 2 ft. wide, and include window and door sections. Under this system any size house may be built so long as specifications are in multiples of two. The steel in each house will cost from \$1,200 to

\$1,300 including fabrication, but this is expected to be reduced by \$300 to \$400 as production increases. Plywood interiors are optional, but the cost will not be affected materially, one way or the other, should these be preferred.

The steel shell of the exhibition home was erected in two working days by four men, and officials of the company believe that with proper cooperation from all concerned this type house can be completely built and equipped in 10 days. A major problem in the past has been to obtain delivery when desired of the various panels which are required, but this difficulty is expected to be minimized in future.

Although the five rooms of the house do not require much more space than does the living room in most dwellings, the arrangement is such that the smallness is not particularly noticed. The architect, William Van Alen, who is noted for having designed the Chrysler Build-

ing in New York, apparently kept well in mind that this type home was primarily intended for the working class and was not to be too expensive, as he included certain features which are not commonly found in larger homes, such as a four-foot bath tub in place of the more usual five-footer, and a single shelf for books in the living room instead of an entire wall of shelves such as is found in a great many houses today. With an eye to securing economy without sacrificing comfort, he planned a compact, but convenient, combination kitchen and dining room, which includes sufficient space for all the usual kitchen appurtenances, stove, oven, refrigerator, large sink and cabinet. So unusual is this arrangement that the housewife may prepare an entire meal and serve the table without having to take more than one step in any one direction.

This house is built without a basement, heating and air conditioning equipment being contained in a few square feet in the walls near the center of the structure. The system was designed by members of the American Gas Association, and was installed under the supervision of the Consolidated Edison Co. Gas heat, thermostatically controlled from the living room, and air conditioning have been combined in a small unit, which through a short duct system, distributes warm, conditioned air to the rooms of the house. The blower may be used to circulate the house air in summer months. It is estimated that because of the insulation qualities of this type building (a mineral known as vermiculite being used to a thickness of 4 in. in the walls, floor and roof), fuel costs will amount to only one-fifth as much as in an ordinary home. Insulative protection is said to be equal to that of a 52-in. brick wall.



SAFETY LETTERS & FIGURES
WRITE FOR PRICE LIST

SAFETY STEEL STAMPS

PAT RE 17846

WHY TAKE CHANCES WITH THIS
DUE TO THE COMBINATION OF ALLOYS AND
NOT HEAT TREATMENT, SAFETY STAMPS ARE
IMMUNE TO MUSHROOMING OR SPALLING



M. E. CUNNINGHAM CO. 101 E. Carson St., Pittsburgh, Pa.

R. J. Wysor Elected President of Republic Steel Corp.

THE election of R. J. Wysor as president of Republic Steel Corp. was announced on April 14 by T. M. Girdler, chairman, who has held the offices of both chairman and president. A statement issued by the corporation said that Mr. Girdler will continue as chief executive officer of Republic in active charge of all its affairs, and Mr. Wysor will have complete supervision of the affairs of the corporation under Mr. Girdler's direction.

Commenting on Mr. Wysor's election, Mr. Girdler said: "The elevation of Mr. Wysor to the presidency of Republic is a well-deserved recognition of the efficient and loyal service rendered by him to the corporation since its formation in 1930."

Mr. Wysor is 51 years of age. He has been associated with Republic since 1930, when it was formed, having been vice-president in charge of operations from 1930 to



R. J. WYSOR

September, 1935, and executive vice-president and general manager since that date. His connection with the steel business dates back 31 years. Immediately prior to his connection with Republic he was general manager of the Jones & Laughlin Steel Corp., of which Mr. Girdler was then president. When Mr. Girdler accepted the position of chairman of the board of Republic, Mr. Wysor went with him as vice-president in charge of operations.

A statement issued by the corporation said: "During the past two years the business of Republic has expanded rapidly through the acquisition of the Corrigan, McKinney Steel Co. and Gulf States Steel Co., and of substantially all of the stock of Truscon Steel Co., with the result that Mr. Girdler's duties have been greatly increased, and Mr. Wysor, in his new position, will cooperate with Mr. Girdler in the handling of such duties."

At the meeting of Republic stockholders on April 14 the board of directors was enlarged from 12 to 15 members, and the new directors elected are W. H. Coverdale, former president of Gulf States

Low Cost Handling

Easy rolling trolleys carry heavy loads smoothly over American MonoRail hand or power operated systems.

Write for new book on MonoTractor drive for Overhead Handling



Small installations of American MonoRail often bring remarkable savings in labor hours. With a simple system, lift and carry operations are performed without excessive labor, hence costs are sharply reduced. One operator claims his system does the work of three men. Another states he would require 30% more floor area without American MonoRail.

THE AMERICAN MONORAIL CO.

13103 Athens Ave., Cleveland, O.

Steel Co.; Julius Kahn, former president of Truscon Steel Co., and William S. Mather.

Mr. Girdler told stockholders that Republic made more money in the first quarter than in all of 1935, when it earned \$4,455,000. He said that plants are operating at 90 per cent and that he was very hopeful for the remainder of the year. He added that "The increase in prices of steel commodities has not compensated for the advance in wages and the cost of materials. This is true of the steel industry in general and also of Republic. If we make more money now, it is due to a greater volume. If the volume goes off, we will lose that betterment."

Asked by a stockholder as to prospects for third quarter, Mr. Girdler replied that the third quarter looks good, but that it is impossible now to predict the volume of business in that period.

"Our relations with our employees are wonderfully good," said Mr. Girdler. "If we are not pressed by the Government or other sources to do things, we will have no trouble. A large majority of our men do not want anything to do with outside union leaders."

He commented that Republic is already making plans for the enlargement of capacity at the Gulf State's plant and that Republic's continuous strip mill will be in operation by the end of the year.

Stockholders approved a pension plan for about 75 of the key men of Republic whereby the men and the company will share the cost. Republic's share will be about \$125,000 a year.

Purchasing Agents To Hear Trade Leaders

SOME of the nation's outstanding industrial leaders will lead discussion on fourteen commodities, including steel, coal, petroleum, aluminum, copper, lumber, tin, lead, zinc, refractories, coke, paint, glass and paper, at the twenty-second international convention of the National Association of Purchasing Agents to be held in Pittsburgh May 24 through May 27, it has been announced by Thomas D. Jolly, chairman of the program committee.

Speakers and their subjects

which have been made public are: "Coke and Other By-Products of Coal" by C. J. Ramsburg, vice-president, Koppers Co., Pittsburgh; "Petroleum and Its Products" by Dr. Paul D. Foote, executive vice-president of the Gulf Research & Development Corp., Pittsburgh; "Refractories" by John D. Sullivan, chief chemist, Battelle Memorial Institute of Columbus, Ohio; "Aluminum" by S. K. Colby, vice-president, Aluminum Co. of America, Pittsburgh; "The Steel Industry" by J. H. Van Deventer, Editor of THE IRON AGE; "Copper" by Albert E. Petermann, vice-president, Calumet & Hecla Consolidated Copper Co. of Michigan, New York; "Lumber" by Henry J. Eckstein, president, Foresta Factors, Inc., New York; "Tin, Lead and Zinc" by C. S. Trench, editor of the American Metal Market, New York.

Between 1200 and 1400 members of the N.A.P.A. are expected to attend the Convention.

Bolt and Nut Makers Elect Officers

AT the sixth annual meeting of the American Institute of Bolt, Nut and Rivet Manufacturers, held at the Waldorf-Astoria Hotel, New York, April 8, Arthur D. Morris, president Bayonne Bolt Corp., Bayonne, N. J., was reelected president; Beale E. Poste, Columbus Bolt Works Co., Columbus, Ohio, was elected vice-president succeeding George S. Case, and James D. Eggers was reelected secretary-treasurer. Herman H. Lind, recently elected executive vice-president, continues in that capacity.

A change was made in the plan that has been followed in electing a new executive committee at each annual meeting. Instead it was decided to have a membership with staggered expiration dates. The following were elected to this committee:

For a three-year term: George S. Case, Lamson & Sessions Co., Cleveland; A. M. Jones, Buffalo Bolt Co., North Tonawanda, N. Y.; and Theodore F. Smith, Oliver Iron & Steel Corp., Pittsburgh. For a two-year term: C. L. Brackett, National Machine Products Co., Detroit; Charles R. Ferguson, Pittsburgh Screw & Bolt Corp., Pittsburgh, and Evans Ward, Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y. For a one-year term: Meyer Paper, Lewis Bolt & Nut Co., Minneapolis, H. C. Weidner, Townsend Co., New Brighton, Pa., and J. Edward Weit, Atlas Bolt & Screw Co., Cleveland.



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• Commercial cap screws are sold from a standard price list but that does not mean that all cap screws are made as well as Cleveland Cap Screws. We invested many years in time and effort, and have gone to great expense, to develop the Kaufman Process, patented, our own plant method of making a cap screw better than it has ever been made before. By the extrusion process we developed, cap screws are stronger, more accurate in fit, and have a finer full finish. Heads and threads are bright and clean, chamfered flats are smooth and true. THE CLEVELAND CAP SCREW COMPANY, 2929 E. 79th St., Cleveland, Ohio.

CLEVELAND CAP SCREWS
BET SCREWS • BOLTS AND NUTS

Selecting a Motor To Fit a Drive

(CONCLUDED FROM PAGE 42)

changed around, 278 motors were changed to smaller sizes, the total horsepower was cut from 1710 hp. to 878 hp., power factor was raised from 63 per cent to 78 per cent, and the motor investment account was decreased by about \$10,000; all at a cost for the changes involved of approximately \$3,000.

Correction of low power factor conditions will be treated in detail in later articles of this series, particularly by means of the use of capacitors and of synchronous motors. And, of course, improvement of low power factor conditions by means of group drives is a subject of paramount interest, since where power may be logically applied to machines through modern group drive arrangements the resultant economies may be measured by many more yard-sticks than power factor correction alone. Case studies involving complete analyses of modern group drives in typical American industrial plants will be presented in detail in many future articles.

A reasonable familiarity with the tables of motor operating characteristics published in many of the motor manufacturers' catalogues will, in connection with the foregoing explanations, be of material assistance to anyone charged with the responsibility of applying power to machinery in any plant, economically. To study each application on its own merits, individually, instead of being satisfied with rule-of-thumb methods of motor selection, is the first and biggest step to be taken toward insuring the Right Drive for Every Machine.

(The next article in this series will treat of couplings and clutches, describing the equipment available and methods of application.)

Lewis Gets Orders For Tennessee Mills

LEWIS FOUNDRY & MACHINE CO., a subsidiary of Blaw-Knox Co., has received a contract from Tennessee Coal, Iron & Railroad Co. for two three-high roughing mills, complete with Lewis roller and catcher tables.

...OBITUARY...

WILLIAM C. CHANCELLOR, assistant general superintendent, Lorain works, National Tube Co., died recently. He started with the National Tube Co. in 1916 as metallurgist at the Ellwood works. In 1926 he was transferred to the Lorain works as metallurgical engineer and a short time later became superintendent of the inspection department. In 1935 Mr. Chancellor was appointed assistant general superintendent of the Lorain works, which position he held until the time of his death. He was graduated from Carnegie Institute of Technology in 1909 with a B.S. degree in metallurgy.

JOSEPH H. NASH, retired superintendent of motive power for the Illinois Central Railroad, died April 14. He was 65 years old.

JOHN C. BIRDELL, secretary, the Birdsell Mfg. Co., South Bend, Ind., farm implement manufacturer died April 10 at his home in South Bend, Ind.

GEORGE C. LUCAS, president, Cleveland Frog & Crossing Co., Cleveland, died April 14, aged 79 years.

ROBERT D. GOULD, treasurer of both the Fitchburg Grinding Machine Co. and the Portable Electric Tool Corp., died in Fitchburg, Mass., on April 13, aged 77 years. He formed the partnership of Damon & Gould, now known as the Fitchburg Hardware Co., 50 years ago. In 1916, he entered the grinding company, being president for several years.

GEORGE A. LUTZ, founder and president of Lutz File & Tool Co., Cincinnati, died at his home in that city, on April 9. He was 59 years old and had been ill for nearly a year. Mr. Lutz began his career as a tool salesman. He founded his own company when he was 20 years old. Becoming ac-

New 13oz. WELDIT MODEL W WELDING TORCH
with BUILT-IN Automatic GAS AVER

SAVES fuel—reduces welding cost—eliminates idle flame hazards. As operator grasps handle of torch placing thumb on lever in natural position, full welding flame is instantly on. Release thumb, and automatically flame is reduced to pilot size. No re-lighting or re-adjusting flame between welds. Weighs only 13 ounces, no mechanism in handle, fuel control valves are conveniently located in front of torch handle. Actual savings will soon pay for torch.

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Test this WELDING TORCH free FOR TWO WEEKS IN YOUR PLANT

Automatic LEVER CONTROL GAS AVER

Automatically ON IN USE

Automatically OFF NOT IN USE

tive in politics, Mr. Lutz was elected Sheriff of Hamilton County in 1934 and resigned because of ill health early this year.

♦ ♦ ♦

WILLIAM J. MORRIS, formerly of Pittsburgh, died April 13 at his winter home in Miami Beach, Fla., aged 86. Before retiring from active duty several years ago, he was president of the Morris & Bailey Steel Co. which merged with Oliver Iron & Steel Co. in 1922. He was president of the

Cold Rolled Strip Steel Association for many years.

♦ ♦ ♦

GEORGE PUCHTA, for many years head of the Queen City Supply Co., Cincinnati, died at a hospital in Manila, P. I., on April 18, while on a vacation cruise, at the age of 77 years. After attending elementary school and a short term at a business college, he joined J. G. Fuller at the age of 14. With another partner he bought the mill supply business of Post & Co. in 1890 and 14 years later he became the sole owner, the company being reorganized as the Queen City Supply Co. Mr. Puchta was also a founder of the Cincinnati Frog & Switch Co. He was active in political and business enterprises and was a former mayor of Cincinnati.

Aluminum Co. Grants Another Wage Rise

PITTSBURGH, April 20.—Approximately 7000 workers in the three Pittsburgh district plants of the Aluminum Co. of America have been given a wage increase, the third in less than a year, of 5c. an hr. The increase became effective April 16.

About \$550,000 will be added to the annual payroll of the New Kingsington, Logan's Ferry, and Arnold plants by this decision. Should workers in all plants of the company receive a similar rise, the annual payroll will be increased by more than \$2,000,000. The three increases place the minimum wage at 63c. an hr., with a majority of workers being paid at substantially higher levels.

On the important question of increased metal prices, brought about by the abnormal demand for all metals, Arthur V. Davis, chairman of the board, has predicted that there will not be any runaway market in aluminum. He stated that the company management is sympathetic with the effort to restrain advances in the prices of durable and consumer goods and that the policy of the company for the remainder of the year will concern itself with the maintenance of present prices, making advances only if necessary to meet increased costs of labor and raw materials.

The company's new extrusion plant at LaFayette, Ind., for which ground was broken last week, is a part of the \$26,000,000 expansion program which is being carried on at all the company's locations. The new plant may also include a tube mill and a rolling mill. It is situated on 90 acres of

land just outside the city limits, and has a floor area of more than six acres.

Bethlehem's Profits On Upward Trend

FIRST quarter profits of Bethlehem Steel Co. will follow the upward trend of recent months, according to Eugene G. Grace, president, who presided at the company's annual stockholders' meeting in Wilmington, Del., on April 13. Stockholders were also told that second quarter earnings would at least be sustained, as indicated by present order backlogs.

Employment was shown to have passed the 92,000 mark, and basic wage rates paid by the company were said to be 52½ per cent above the 1929 level. Average annual earnings of Bethlehem employees are now \$1900, compared with \$1700 in 1929.

The company's construction program, directed mainly toward expanding facilities for the production of consumer goods, was stressed by Mr. Grace, who declared that the tonnage of steel consumed in the manufacture of tin plate alone last year exceeded that used in the production of structural steel for the construction industry.

Mr. Grace said that the company spent \$40,000,000 in 1935 and 1936 on its construction program, and that an additional \$40,000,000 would be required to complete the program. Authorized work now under way includes the new hot strip mill, the additional cold reduced tin plate mill, the rod and bar mill with wire drawing and finishing facilities, all at the Maryland plant, and many lesser improvements at other plants.

Oesterlein Machine Co. To Resume Partially

CHARLES D. OESTERLEIN, who has been long associated with the machine tool industry, and a number of associates have acquired title to the remaining assets of the Oesterlein Machine Co., 1653 Hamer Street, Cincinnati. These assets consist principally of the production machine business and good will. For the present the company will specialize in the rebuilding and retooling of existing machines, and in replacement parts, but is prepared to quote on new installations.



Bolt products
Carefully made
To exact size
From high grade steels
Of selected hardness
And tensile strength.
Threads accurately finished
Each item a real
Standardized part
Carefully shipped
In strong packages.



Employee Representation Plans Not Affected by Wagner Act Decision

FREELY chosen employee representation plans or legitimate worker organizations confined to the plant were not outlawed in the Supreme Court's recent interpretation of the Wagner Act, business men were assured in the weekly news letter of the National Association of Manufacturers.

In an analysis of the court's opinion, the association's legal department noted that the decisions applied the commerce power to a new field but did not extend it to all employment relations in industry.

"The act as interpreted does not compel contract or agreement with anyone, individually or collectively," the analysis said. "The obligation created is that of reasonable negotiation with the true representatives of the majority of employees, whether such representatives be from within or without the employers working force. No legitimate organization confined to the plant or any freely chosen employee representation plan is outlawed. If the employees prefer an organization confined to the plant for the purpose of collective bargaining it is their right to form one and deal with their employer through it and it is the business of the law to recognize and protect."

FTC Extends Time in Robinson-Patman Case

WASHINGTON, April 20.—The Federal Trade Commission has extended one week to April 23 the time for filing of replies in answer to the complaint in the Oliver Brothers, Inc. case brought under the Robinson-Patman Act and charging violation of the brokerage clause. Oliver Brothers, with offices in New York, operate a market information and purchasing service and the commission alleges that the firm does not render service for commissions received.

The first answer made was filed last week by Charles F. Baker & Co., Inc., Boston, maker of special nails, who stated that the company in return for services of the Oliver Brothers in procuring orders, pay a monthly commission at the rate of 2½ per cent of the invoice value of the merchandise charged with respect to which the commission is paid. Baker company said that for

over 20 years it has received orders from Oliver Brothers for special nails manufactured by the former.

The complaint alleges that Oliver Brothers, while acting as agent of the buyers subject to their direct or indirect control, accepted from the selling group so-called brokerage fees or commissions, varying from one to 10 per cent of the quoted agreed sale prices without rendering service of any kind to the sellers. Such commissions, the commission charged, were in turn paid over by Oliver Brothers to its buyer clients without rendering any service to the buyer.

Central Furnace Goes Into Blast

A SECOND blast furnace of the Central furnace plant of the American Steel & Wire Co., Cleveland, has been placed in operation. This plant formerly consisted of four furnaces. Two of these were scrapped in 1935 and the other two were rehabilitated and their operation was turned over to the Carnegie-Illinois Steel Corp. Since that time one of the furnaces has been in blast making merchant iron and now the increased demand for steel-making iron by the U. S. steel plants has necessitated the starting of the second furnace. The operation of the Central furnaces will be turned back to the American Steel & Wire Co. on May 1.

Trade Agreements and The Anti-Trust Laws

H. A. TOULMIN, JR., has recently published a book under the above title which is particularly useful in view of present day legislation in relation to modern business activities.

The succession of Federal and State laws controlling business contracts or written agreements between sellers and buyers, which exact both civil and criminal penalties, makes this matter one of vital present day importance to the executive. The Sherman-Anti-Trust Act, the Federal Trade Commission Act, the Clayton Act and the recently enacted amendment to the Clayton Act, known as the Rob-

inson-Patman Price Discrimination Act, have made this problem a pressing one for business to meet. The purpose of Mr. Toulmin's book is to provide information and discussion of the theories of the law and of its practical application in the drafting and execution of agreements between purchasers and sellers and between various persons, firms and corporations within an industry. The book consists of 540 pages divided into 17 chapters, each of which deals with an important phase of the broad general subject. The contents are divided in four parts, the first of which deals with trade practice agreements and the second with industrial and trade agreements. Part three covers the subject of anti-trust and price discrimination laws, and part four gives typical forms of agreement for trade practices, patent licenses, cross licensing, etc. etc. An appendix, divided into seven parts, gives a practical interpretation of the Sherman Anti-Trust Law, the Federal Trade Commission Act and other laws affecting business agreements.

Tool Steel Book by Carpenter Steel Co.

NO one can understand a tooling problem like the men who must work with it daily, but frequently these men are handicapped by a lack of simple, concise information on the making, selecting and heat treating of tool steels. In an effort to fill this void, the Carpenter Steel Co., Reading, Pa., has published a 316-page book entitled "Tool Steel Simplified," which is edited by Frank R. Palmer, assistant to the president, and is a model of simplification and readability of a normally complex subject. The price of this book is \$1 a copy.

The book lists the many tool steel terms, and describes the analysis, soundness and timbre [personality] of tool steels. To assist in the selection of the right steel for each kind of tool, a section is devoted to the matched set method, the nine matched tool steels, and describes the application of the matched set method. Heat treating methods and equipment, hardness and toughness testing, and the properties and heat treatment of nine matched tool steels are all reviewed in detail, and considerable attention is devoted to the relation of design to heat treatment, the hot acid etch test, the timbre test, spark testing, furnace atmosphere, quenching and trouble shooting.



... March steel ingot output reaches all-time high.

... British market affected by ore held up at Bilbao.

ONDON, April 20 (By Cable).—Early steep advances in steel prices are expected, and, though much business is being offered, there is a general indisposition to discuss contracts for the second half. Producers welcome this lull as the orders now held will absorb maximum outputs over the next quarter.

There are no prospects for an early improvement in the pig iron supply position. Large ore cargoes for the United Kingdom are held up at Bilbao and their non-arrival will cause grave embarrassment, though large clearances are being

made from Scandinavian and West African ports.

British makers of semi-finished steel are unable to accept orders for delivery before three months, and the hope that rerollers have of operating at maximum capacity lies in the promise of the cartel countries to increase shipments to the United Kingdom.

The British steel ingot output for March was 1,109,500 tons, which is a new all-time record. However, home specifications are so enormous that a rationing system may be introduced. Nevertheless, producers are endeavoring to keep overseas connections, and exports are well maintained.

March exports of pig iron amounted to 16,400 tons, none of which was shipped to the United States. Total exports of iron and steel amounted to 231,550 tons.

The demand for tin plate is quieter, but makers are heavily booked and are still inconvenienced by the shortage of steel. An increase in tin plate bar prices would probably cause a further rise in tin plate prices.

Export demand for Continental iron and steel is active and deliveries are for four to five months.

British prices, as well as Continental gold prices, are unchanged.

Hamburg merchant has contracted for 1500 tons of scrap at 120 s., c. i. f. Liverpool, to be shipped from a North European country. This is twice as much as was paid in December and three times the price paid a year ago. German prices are now about half the British prices.

German steel works are booking export orders and will continue to do so up to the following monthly limits: Pig iron, 25,000 tons; semi-finished steel, 18,000 tons; bars, 53,000 tons; joists, 18,000 tons; plates and sheets together, 39,000 tons; hoops, 15,000 tons; steel tubes, 32,000 tons; wire, 21,000 tons.

Compensation (barter) business is no longer being done by Germany, though it served its purpose in the years following 1933. Barter business amounted to as much as 80 per cent of the whole German external business in 1935 and was an effective weapon in the hands of the German Minister of Trade to overcome the crisis and the consequences of the anti-German boycott. It had many faults and its handling was difficult and expensive, but it helped to increase exports considerably, and without it the external trade would never have come back to figures to which it runs at present. In the iron and steel industry all barter transactions were abandoned in the third quarter of 1936. All other industries followed, and since March not a single barter transaction has been booked. Of course the clearing agreements and the government-to-government compensation agreements continue. Except for these all business is executed on a cash basis in the currency of the importing country.

The scrap market is troubled by the fact that old tonnage from the breaking up of ships is practically not obtainable. Now that costs of shipbuilding have gone up so much, old vessels are not sold for scrapping in sufficient quantities. The 1937 scrapping of old ships will yield not more than 65 per cent of the 1936 tonnage from the same source, and that in turn was 18 per cent smaller than in 1935.

The International Wire Export Co. has not yet resumed sales of wire and wire products for export. The trade has very large orders in hand and is stormed by buyers abroad to sell. Prices are now up to 20 s. above official quotations without finding sellers. Some Hamburg exporters have bought wire in the United States for export to India, quite an unusual transaction. It is expected that the Wire Export company will start selling again by the end of April.

More British Steel May Go For Export

ONDON (Special Correspondence).—In relation to Britain's total volume of production it is felt that far too little steel is now being exported. Far too much is going into domestic consumption. As a result, the iron and steel industry is in favor of a ban being placed on steel for new building construction in the United Kingdom, and it is likely that an almost complete ban will shortly come into operation. This will make some of the existing buildings more valuable.

The unsatisfactory export position is shown by the latest statistics. Iron and steel exports in February at 202,600 tons were only 32,200 tons and 29,700 tons in excess of February, 1936 and 1935, respectively. Production in that month reached 1,599,600 tons, compared with 1,523,200 tons in February, 1936.

Total British exports in 1936 amounted to 2,205,000 tons, while production reached the record figure within the last decade of 19,384,000 tons. In 1929 exports were 4,380,000 tons and production 17,225,000 tons. In 1932, when the

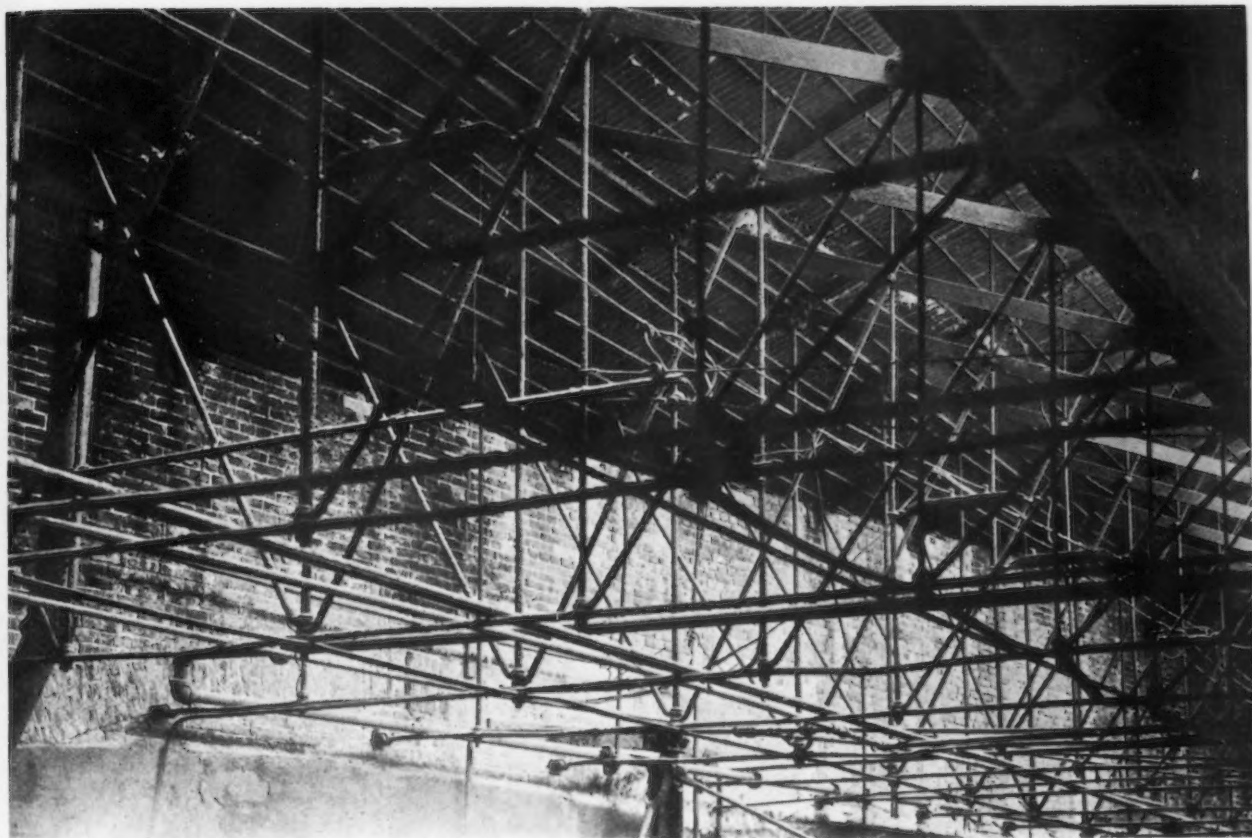
world depression caused production to decline to 8,830,000 tons, exports at 1,887,000 tons, were only 318,000 tons below those for 1936.



... Steel prices advance further.

... Scrap from North Europe brings high figure.

HAMBURG, GERMANY. (Special Correspondence). Prices have advanced further. Bars have been sold at 10. (paper), the highest price since the Ruhr occupation in 1923. Sheets and plates are now about 22 s. 6 d. above the official prices. Foundry iron has been sold at 115 s. and hematite at 132 s. 6 d. Scrap is fetching fancy prices. A



Hand Forged Roof Trusses of Civil War Days

THE illustrations presented show early examples of hand forged roof trusses found in the 101 year old Southwark Foundry & Machine Co., Philadelphia (now the Baldwin Southwark Corp.).

The original drawing of the building, now being dismantled, shows the date of 1866, which makes this construction 71 years old. Our grandfathers built with the idea of permanency in mind.

The plant was located at Fourth & Washington Streets, in Philadelphia. The building varied in width and no two trusses were, therefore, of the same length or construction. While it has not been definitely ascertained that this construction was the first of its kind, it surely places the "saw tooth" type of plant roof back further than most of us have imagined.

Highway Work Leads In Structural Steel

ALTHOUGH there is an increasing demand for structural steel for buildings and other similar private work, highway construction continues to afford the most important market, according to an analysis of business issued by the American Institute of Steel Construction.

During 1936 the structural steel fabricating industry produced over 1,600,000 tons of fabricated structural steel, of which 37 per cent

went into bridges, including railway as well as highway bridges, 25 per cent into buildings—governmental, institutional and commercial. A little better than 22 per cent went into the erection of new industrial plants. The year 1936 was very active in that direction. The institute says:

"The public is inclined to think that public works constituted an important place in our picture, but an analysis of the figures proves that public works, exclusive of bridge building, is small. Only about 3 per cent of the fabricated structural steel sold in 1936 is

known to have gone into engineering projects. The remainder, approximately 13 per cent, constituted those odd jobs, all under 50 tons each, that are difficult to classify. In that miscellaneous group are grade crossing projects, repairs and extensions to plants, etc.

"From the point of view of the industry the past year may be considered very happy. It showed a decided revival of business, insofar as volume is concerned. It also showed that the market for our product is not dependent upon public work appropriations. Bridge building is primarily a state or local problem. It does not always have Federal aid. And bridge building is indicative of the trend of the traffic problem. It has grown to dominating importance within the past decade. We have reason to expect that it will become even of greater importance in the next few years."

'36 Rail Production Up 71 Per Cent

PRODUCTION of rails in the United States totaled 1,219,846 gross tons in 1936, according to figures released by the American Iron and Steel Institute. This figure shows an advance of 508,309 tons, or 71.44 per cent over the 1935

total of 711,537 tons. The 1936 figure represents the highest output of rails since 1930, when 1,873,233 tons was produced.

Of the 1936 volume, 97.16 per cent were rails made by the open-hearth process. Bessemer rails showed a reduction of 48.9 per cent from the previous year and represented only 0.02 per cent of the total volume. The only bessemer rails produced were those weighing less than 60 lb. per yd. Of the 1936 production, the greatest tonnages went into rails weighing 100 and 120 lb., constituting 611,527 tons. Rails running between 120 and 136 lb. were the next in volume at 368,470 tons. Approximately 100,000 tons was produced in the weight range of 85 to 100 lb.

There were 18 active works rolling rails in 1936, and of these five are situated in Pennsylvania.

Mesta Breaks Off SWOC Negotiations

PITTSBURGH, April 20.—Discussions between Lorenz Iversen, president, Mesta Machine Co., and SWOC officials have come to an end for the present on account of the necessity for Mr. Iversen to go abroad on business matters. The following notice has been posted on the bulletin boards of the company setting forth its labor policy for the present:

The company has advised Mr. Clinton S. Golden, regional director, Steel Workers' Organizing Committee, that the schedule of hours of employment, rates of pay, etc., now in effect in this plant will continue in effect until further notice, irrespective of whether an employee is or is not a member of a labor union. The company will do its utmost to prevent any coercion, intimidation or discrimination by any representative of the company against any of its employees for any cause whatsoever. The company shall have the right to discharge employees for reasonable or proper cause during such period, as heretofore, or shall have the right to increase or reduce its working forces if, in the company's judgment, business or other conditions make such increase or reduction necessary. Properly designated representatives of the company will be glad to meet, from time to time, with any committee or committees representing employees to take up for adjustment any disputes which may arise.

Negotiations between Mr. Iversen and SWOC have been in progress for the past two weeks following a short-lived sit-down strike at the company's plant. The SWOC has endeavored to obtain a signed contract, but from the above it is apparent that this move has been unsuccessful for the time being at least.

CONVENTIONS

April 26 to 28—Chamber of Commerce of the United States, Washington. Annual meeting. D. A. Skinner, 1615 H Street, N.W., Washington, secretary.

April 26 to 27—American Zinc Institute, Hotel Statler, St. Louis. Annual meeting. E. V. Gent, 60 East 42nd Street, New York, secretary.

May 3 and 4—Machine Tool Builders' Association, Edgewater Beach Hotel, Chicago. Mrs. Frida Selbert, secretary.

May 3 to 7—American Foundrymen's Association, Milwaukee. Annual convention and exhibit. C. E. Hoyt, 222 West Adams Street, Chicago, executive secretary.

May 4 to 9—SAE summer meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. John A. C. Warner, 29 West 39th Street, New York, secretary.

May 5 to 7—Porcelain Enamel Institute Forum, University of Illinois, Champaign, Ill. Robert G. Calton, 612 North Michigan Avenue, Chicago, president.

May 24 to 27—National Association of Purchasing Agents. William Penn Hotel, Pittsburgh.

June 14 and 15—Association of Machine Tool Dealers, Skytop, Pa. John Sauer, Jr., Peninsular Machinery Co., 2921 East Grand Boulevard, Detroit, secretary.

June 28 to July 2—American Society for Testing Materials, Waldorf-Astoria Hotel, New York. Annual meeting. R. E. Hess, 260 South Broad Street,

General Electric Has Big First Quarter

ORDERS received by the General Electric Co. for the first quarter of 1937 amounted to \$105,747,030, compared with \$59,569,879 for the corresponding quarter of 1936, an increase of 78 per cent, President Gerard Swope has announced. This was the largest first quarter in the history of the company.

Porter-McLeod Buys Higley Machine Co.

THE Porter-McLeod Machine Tool Co., Inc., Hatfield, Mass., has purchased the assets and good will of the Higley Machine Co., South Norwalk, Conn., builder of cold metal sawing machines. The redesign of the Higley line is under way. Standard Higley blades are manufactured and are carried in warehouse stocks in various

parts of the country. An innovation is a hydraulic clamping unit for particular use in multiple cutting and for rail and structural work.

Electro-Deposits Iron More Rapidly

IN seeking various ways for improving the electrolytic process, the National Bureau of Standards has found that by careful control of the temperature and acidity of the iron chloride bath, it is possible to deposit iron at the rate of about 0.012 in. per hr., or about five times as fast as usual. However, the favorable conditions for this rapid deposition are very critical, and hence the process will probably find use only on special occasions.

Galvanizers to Meet With Zinc Institute

IN conjunction with the annual meeting of the American Zinc Institute at the Hotel Statler, St. Louis, April 26 and 27, a three-day convention of the Galvanizers' Committee will be held, their conference extending to April 28. Composed of representatives from technical and operating departments of sheet mills, this group will discuss new methods of applying zinc coatings and the opportunities for increased farm sales. Among the technical subjects are the following: Developments in galvanizing wire and sheets; metallizing or spraying zinc; and the use of pure zinc in hot galvanizing. The merchandising phase of galvanized sheet distribution will also be discussed.

The history of Kane & Roach, Inc., Syracuse, N. Y., including the outstanding contributions of its president and founder, William E. Kane, is interestingly told in a 50th anniversary monograph entitled "Fifty Years of Service," issued by the company. A number of pictures of K & R cold roll forming machines, bending rolls and other products, including some of the early remodels, are reproduced.

Bethlehem Steel Co. has removed its Milwaukee office from the Warner Theater Building to the First Wisconsin National Bank Building, 735 North Water Street. Leander L. Bassett is resident manager.

American Bridge Signs with SWOC; Other Companies Are Negotiating

PITTSBURGH, April 20.—Negotiations between the American Bridge Co. and the Steel Workers' Organizing Committee were completed yesterday and the actual signing of the contract will take place later this week, according to SWOC officials. The agreement affects about 6500 men in the Northern plants of the company, but details covering American Bridge Co.'s Southern plant are to be worked out at a conference to be held later in Birmingham.

A conference was held yesterday with Wheeling Steel Corp. officials and Attorney Earl F. Reed, counsel for the corporation, relative to a written contract covering all of Wheeling's plants. It is expected that a contract between Wheeling Steel and the SWOC will be signed some time this week.

The attitude of some of the larger independent steel companies toward signing a SWOC contract probably will be disclosed within the near future. The SWOC is scheduled to meet with Jones & Laughlin Steel Corp. officials the latter part of this week as well as with officials of the Youngstown Sheet & Tube Co. Although at least 70 companies have signed agreements similar to those concluded with United States Steel Corp. subsidiaries, no large independent steel company has made known its position on the contract question previous to the intimation that Wheeling Steel might sign this week.

The probable action on this question is all the more important in view of the Wagner law decision. No company is compelled to enter into an agreement or to sign a contract, the law merely stipulating that companies must bargain collectively with employees or groups representing employees.

Meanwhile, the SWOC and the Weirton Steel Co.'s employee security league (made up of members of an employee representation plan) are having their own private fight. The SWOC has announced that it will present charges against the Weirton Steel Co. to the National Labor Board to the effect that their members were beaten and driven out of Weirton when trying to organize the employees. The Weirton Steel employee security league, which has as its purpose the protection of its members against outside unions, denies the charges and claims that some of its members have been attacked by SWOC representatives. They have also declared war against the

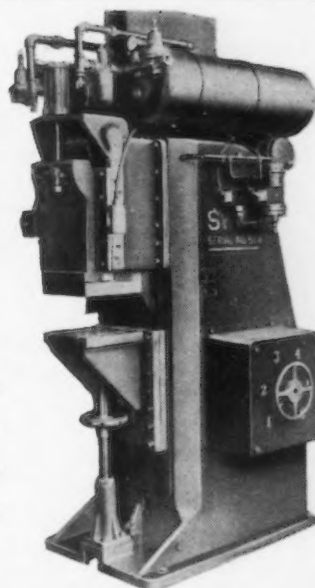
SWOC with the purpose of blocking the latter from gaining a foothold among employees of the Weirton Steel, of whom they claim over 95 per cent belong to their organization. In view of these developments it is improbable that the

SWOC will soon approach National Steel Corp. on the question of recognition.

Some large plants which have signed up with the SWOC include the Timken Steel & Tube Co., Canton, Ohio, and the Caterpillar Tractor Co., Peoria, Ill. Further conferences between the SWOC and Lorenz Iverson, president, Mesta Machine Co., are to take place this week and a meeting with the Pittsburgh Steel Co. is also scheduled.

SWIFT No. 19 PROJECTION WELDING MACHINE *with 350 KVA transformer*

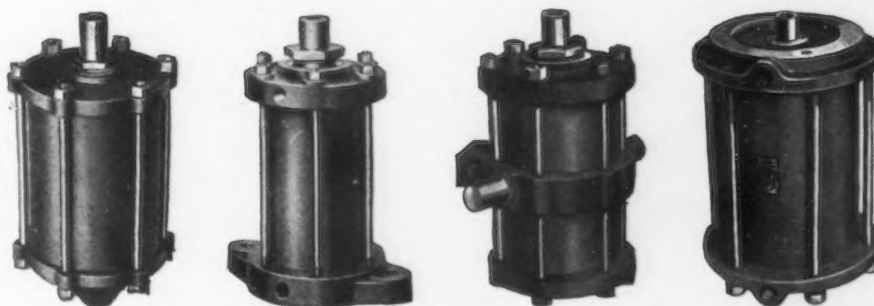
An air operated toggle linkage delivers the two stage welding pressure, a low pressure for heating and a high pressure for upsetting. This operation materially reduces peak current demands.



SWIFT ELECTRIC WELDER CO., 6560 EPWORTH BLVD., DETROIT

Welding machines hand, hydraulic, cam or air operated of the following types: spot, seam, projection, flash, butt, flue and pipe, and gun welding units.

**STYLES—To suit your installation.
STROKES—To meet your requirements.
CAPACITIES—As you need them.**



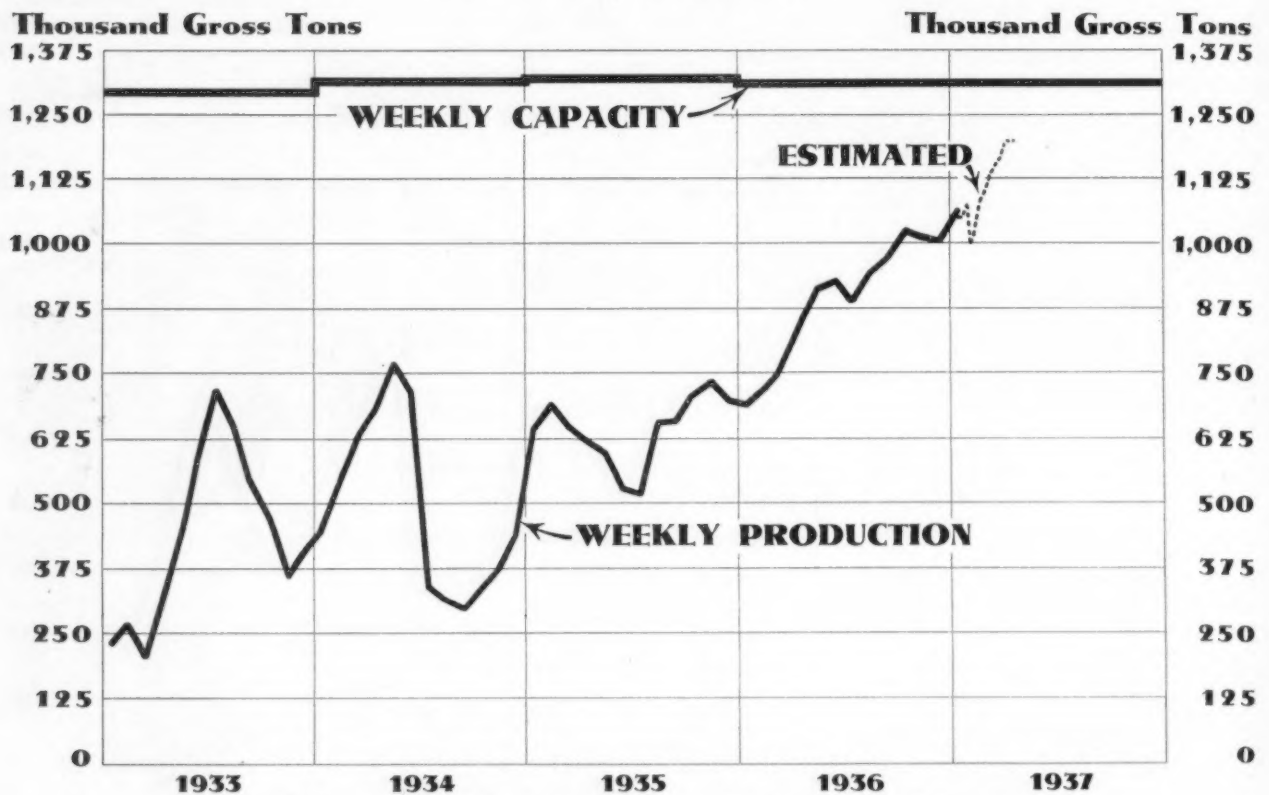
T-J NON-ROTATING DOUBLE ACTING AIR CYLINDERS

May we send you our catalog which gives the specifications of these cylinders?

THE TOMKINS-JOHNSON CO.
628 N. Mechanic Street Jackson, Michigan

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

| District | Current Week | Last Week |
|--------------------|--------------|-----------|
| Pittsburgh | 94.0 | 94.0 |
| Chicago | 86.0 | 84.0 |
| Valleys | 90.0 | 89.0 |
| Philadelphia | 67.5 | 67.5 |
| Cleveland | 87.0 | 75.0 |
| Buffalo | 92.0 | 92.0 |
| Wheeling | 99.0 | 99.0 |
| Southern | 75.0 | 75.0 |
| Ohio River | 90.0 | *90.0 |
| Western | 95.0 | 92.0 |
| St. Louis | 90.0 | 87.0 |
| Detroit | 100.0 | 100.0 |
| Eastern | 98.0 | 98.0 |
| Aggregate | 92.0 | 91.0 |

* Revised.

Weekly Booking of Construction Steel

FROM THE IRON AGE

| | Week Ended | | | | Year to Date | |
|--|----------------|----------------|---------------|----------------|--------------|---------|
| | April 20, 1937 | April 13, 1937 | Mar. 23, 1937 | April 21, 1936 | 1937 | 1936 |
| Fabricated structural steel awards..... | 14,200 | 42,300 | 18,900 | 20,000 | 416,745 | 333,190 |
| Fabricated plate awards..... | 2,160 | 0 | 2,670 | 3,230 | 53,190 | 101,195 |
| Steel sheet piling awards..... | 450 | 0 | 0 | 0 | 15,380 | 15,405 |
| Reinforcing bar awards..... | 4,045 | 5,020 | 2,120 | 7,150 | 58,385 | 133,905 |
| Total Lettings of Construction Steel.... | 20,855 | 47,320 | 23,690 | 30,380 | 543,700 | 583,695 |

...SUMMARY OF THE WEEK...

... Steel ingot output hits a new peak of 92 per cent.

o o o

... Actual output now is larger than in record-breaking month of May, 1929.

o o o

... New business reduced but still in good volume; deliveries easier.

STEEL ingot output has hit a new peak of 92 per cent of the country's capacity, or an estimated total for this week of 1,204,979 gross tons, which is slightly above the all-time record of 1,193,284 tons per week in May, 1929. At that time, however, the capacity of the industry in open-hearth and bessemer steel was only 60,990,810 tons annually, against present capacity of 68,290,862 tons. The sharpest gain was in the Cleveland-Lorain district, where operations jumped 12 points to 87 per cent.

Heavy shipments of finished steel are creating an easier situation for the steel user, causing a relaxing of some of the intense pressure on the mills for deliveries that was prevalent a month or so ago. While orders with individual steel companies are running from 10 to 30 per cent behind those of the like period in March, this is not a serious falling off, considering that March sales were the heaviest of the post-depression period. Moreover, new sales are not far below shipments in volume and would be much heavier if mills were willing to accept all of the third-quarter business that is offered. So far, most of the mills are restricting third-quarter reservations to sheets and strip. In sheets it seems quite probable that the mills could sell out for the remainder of the year, and, in fact, a few orders have actually been entered for the fourth quarter.

The delivery situation has become improved in some products, not so much because of falling off in new business, but because mills are getting out more tonnage and thereby have a few open spaces on their June schedules. Light gage cold-rolled sheets are now obtainable in six to eight weeks, strip steel and bars in four to six weeks. Plates and shapes are sold up into June. Tin plate is sold out until October, with production running 100 per cent.

Building projects of the smaller type are fairly numerous, but reports from contractors and architects indicate that a good many construction jobs of large size have been postponed or abandoned owing to higher material and labor costs, notwithstanding the fact that fabricated structural steel quotations have not yet reflected the recent \$4 a ton advance on plain material. Whatever slackening in demand for plates and shapes may occur by curtailment of construction work is likely to be offset in part by further buying of railroad equipment. The Baltimore & Ohio will buy 2000 freight cars and the Chesapeake & Ohio 500, while an inquiry from the Central of Brazil calls for 1000 cars. In addition, the Milwaukee Road will build 2022 cars in its own shops, and the Burlington will build 2500 cars and 14 locomotives. The Pennsylvania is also embarking on a large program.

Steel buyers have as yet received no intimation from the mills as to what action will be taken on third-quarter prices. Nevertheless there is growing belief that no further advances will be made for that period excepting possibly on wire products and pig iron. Price announcements are not expected until about May 20.

WITH the arrival of two cargoes of iron ore at Lake Erie ports and the dispatch of 22 additional cargoes on Monday night, the 1937 ore season has made the earliest start in years, and water shipments this month may break all April records.

Pig iron production is increasing as additional furnaces go into blast. The American Steel & Wire Co. has started a second Central furnace at Cleveland, and Republic Steel Corp. has resumed operation of a rebuilt stack at its Corrigan, McKinney plant. Three merchant blast furnaces in the East are scheduled to resume operations next month. Meanwhile, foreign inquiry for pig iron has brought offers up to \$28 a ton, Atlantic port, and a good deal of iron could be sold for shipment abroad if it were available.

For the third consecutive week scrap prices have declined in all markets. Heavy melting steel is \$1 lower at Philadelphia and 50c. lower at Pittsburgh and Chicago, reducing THE IRON AGE composite price to \$20.75, erasing all of the gains since early March. Recent weakness is believed to be due in part to efforts of large scrap brokers to depress the market in order to cover on 350,000 tons they have sold jointly to a European raw material cartel, headed by Great Britain. Prices paid were \$22.65, f. a. s. Atlantic ports, for No. 1 steel scrap and \$21.65 for No. 2 scrap. This transaction was brought about in anticipation of possible action by Congress to license exports of scrap.



...PITTSBURGH...

... New orders running 20 to 30 per cent behind March.

o o o

... Operating rates remain high but backlogs are not being pared down much.

o o o

... Heavy melting steel scrap off 50c.

PITTSBURGH, April 20.—Despite the fact that total bookings so far this month are running 20 to 30 per cent below the same period last month, unfilled orders are sufficient to support an operating rate of 94 per cent in the Pittsburgh district, unchanged from last week. Wheeling district ingot output is unchanged at 99 per cent. Shortage of steel and the attempt to run as many departments as possible on a 40-hr. week basis preclude any substantial falling-off in ingot output for several weeks. Furthermore, new business is such that a rapid paring down of backlogs is impossible. Although there has been a downward trend in specifications for most finished steel items within the past few weeks, the decline has not been of a magnitude to cause alarm, especially in view of the heavy commitments made in March.

Movement of semi-finished steel is brisk and, although new specifications are about 35 per cent below the volume placed in the same period in March, some of this decline in bookings is due to steel shortages. Specifications for hot-rolled bars have been a little lighter in the past week, but the decline has not been sharp enough to indicate a definite trend. Bookings of cold-finished bars are off considerably with little chance of a fresh buying movement for the next few weeks at least.

Heavy plate and shape orders continue to increase and backlogs are greater than a week ago, but both awards and inquiries in the past week have been below the average of a few weeks ago. Shipments of lighter gage cold-rolled sheets have improved and are now

obtainable in from six to eight weeks. A renewed buying movement for clean-up purposes on 1937 models by the automobile makers would, however, change this situation over night. Meanwhile, backlogs on galvanized and hot-rolled annealed sheets are still running from 22 to 23 weeks. Strip steel unfilled tonnage has been reduced some recently with the result that deliveries are a little easier, hot-rolled running from four to six and cold-rolled about six to seven weeks.

Tin plate operations continue at 100 per cent of capacity.

No. 1 heavy melting steel is off 50c. a ton.

Pig Iron

Current demand for pig iron is still being controlled somewhat by the willingness of producers to accept orders. Stocks at both producers' and customers' plants are still negligible and there is little chance that this situation will change until the present urgent demand slows down a little. It is understood the Sharon Steel Corp. is contemplating the blowing in of its Lowellville furnace which has been idle for several years.

Semi-Finished Steel

New specifications are off a little from last week and are about 35 per cent below the volume placed in the like period in March. This decline in bookings, however, does not give a true perspective of the actual demand, since most semi-finished producers are not in a position to accept all of the orders offered to them. Lack of raw steel and the urgent requirements from

their own finishing mills preclude a too liberal policy of distribution.

Bolts, Nuts and Rivets

A fair volume of new business is being received from miscellaneous sources, although the aggregate tonnage is considerably below that placed a month ago. Producers have welcomed this breathing spell in that their backlogs are substantial, with some pressure being exerted for more prompt deliveries. A heavy movement of material is going forward to fabricating shops, railroad car builders, and railroad car repair shops. The awards for 5600 cars made last week, will benefit local producers.

Bars

Bookings have declined some in the past week, although the drop has not been sharp. Demand is more or less spotty in that some days disclose meager tonnages while the following day will more than make up for the previous light demand. There is a discernible tendency for the trend of new business to show a slow downward trend, although the total volume of business continues to such an extent that backlogs have not been reduced materially. Hot rolled bar backlogs are averaging about four to six weeks and the total amount of business placed since the first of the month is approximately 40 per cent under the like period in March. An important factor in the present situation is the pressure from all sides for better deliveries, indicating that regardless of the heavy forward buying movement last month, no unduly large inventories have been built up.

Cold-Finished Bars

Specifications continue light, with the total volume of business being placed substantially below that booked a month ago. Producers have made some headway in paring down their backlogs which are now averaging six to eight weeks. Most prominent among present buyers is the jobbing trade whose stocks were greatly depleted last month. Fresh automobile buying is of no consequence at this time but it is felt by some that one more buying movement will take place for the 1937 models before the changeover period.

Reinforcing Bars

Deliveries are a little easier but are still not good enough to suit customers. Inquiries in the past week were not very impressive. The Bureau of Reclamation is asking for quotations on 1600 tons for a project at Pomona, Wash.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

| Per Gross Ton: | Apr. 20, 1937 | Apr. 13, 1937 | Mar. 23, 1937 | Apr. 21, 1936 |
|---------------------------------|---------------|---------------|---------------|---------------|
| Rails, heavy, at mill | \$42.50 | \$42.50 | \$42.50 | \$36.37 1/2 |
| Light rails, Pittsburgh | 43.00 | 43.00 | 43.00 | 35.00 |
| Rerolling billets, Pittsburgh.. | 37.00 | 37.00 | 37.00 | 28.00 |
| Sheet bars, Pittsburgh | 37.00 | 37.00 | 37.00 | 28.00 |
| Slabs, Pittsburgh | 37.00 | 37.00 | 37.00 | 28.00 |
| Forging billets, Pittsburgh... | 43.00 | 43.00 | 43.00 | 35.00 |
| Wire rods, Nos. 4 and 5, P'gh. | 47.00 | 47.00 | 47.00 | 38.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, grvd. steel, P'gh, lb... | 2.10 | 2.10 | 2.10 | 1.80 |

Finished Steel

| Per Lb.: | Cents | Cents | Cents | Cents |
|---|--------|--------|--------|----------|
| Bars, Pittsburgh | 2.45 | 2.45 | 2.45 | 1.85 |
| Bars, Chicago | 2.50 | 2.50 | 2.50 | 1.90 |
| Bars, Cleveland | 2.50 | 2.50 | 2.50 | 1.90 |
| Bars, New York | 2.78 | 2.78 | 2.78 | 2.20 |
| Plates, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.80 |
| Plates, Chicago | 2.30 | 2.30 | 2.30 | 1.85 |
| Plates, New York | 2.53 | 2.53 | 2.53 | 2.09 |
| Structural shapes, Pittsburgh | 2.25 | 2.25 | 2.25 | 1.80 |
| Structural shapes, Chicago... | 2.30 | 2.30 | 2.30 | 1.85 |
| Structural shapes, New York. | 2.5025 | 2.5025 | 2.5025 | 2.06 1/4 |
| Cold-finished bars, P'gh..... | 2.90 | 2.90 | 2.90 | 2.10 |
| Hot-rolled strips, Pittsburgh. | 2.40 | 2.40 | 2.40 | 1.85 |
| Cold-rolled strips, Pittsburgh | 3.20 | 3.20 | 3.20 | 2.60 |
| Hot-rolled annealed sheets, No. 24, Pittsburgh | 3.15 | 3.15 | 3.15 | 2.40 |
| Hot-rolled annealed sheets, No. 24, Gary | 3.25 | 3.25 | 3.25 | 2.50 |
| Sheets, galv., No. 24, P'gh... | 3.80 | 3.80 | 3.80 | 3.10 |
| Sheets, galv., No. 24, Gary... | 3.90 | 3.90 | 3.90 | 3.20 |
| Hot-rolled sheets, No. 10, Pittsburgh | 2.40 | 2.40 | 2.40 | 1.85 |
| Hot-rolled sheets, No. 10, Gary | 2.50 | 2.50 | 2.50 | 1.95 |
| Cold-rolled sheets, No. 20, Pittsburgh | 3.55 | 3.55 | 3.55 | 2.95 |
| Cold-rolled sheets, No. 20, Gary | 3.65 | 3.65 | 3.65 | 3.05 |
| Wire nails, Pittsburgh | 2.75 | 2.75 | 2.75 | 2.10 |
| Wire nails, Chicago dist. mill | 2.80 | 2.80 | 2.80 | 2.15 |
| Plain wire, Pittsburgh | 2.90 | 2.90 | 2.90 | 2.40 |
| Plain wire, Chicago dist. mill | 2.95 | 2.95 | 2.95 | 2.45 |
| Barbed wire, galv., Pittsburgh | 3.40 | 3.40 | 3.40 | 2.60 |
| Barbed wire, galv., Chicago dist. mill | 3.45 | 3.45 | 3.45 | 2.65 |
| Tin plate, 100 lb. box, P'gh.. | \$5.35 | \$5.35 | \$4.85 | \$5.25 |

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

| Per Gross Ton: | Apr. 20, 1937 | Apr. 13, 1937 | Mar. 23, 1937 | Apr. 21, 1936 |
|---|---------------|---------------|---------------|---------------|
| No. 2 fdy., Philadelphia | \$25.76 | \$25.76 | \$25.76 | \$21.3132 |
| No. 2, Valley furnace | 24.00 | 24.00 | 24.00 | 19.50 |
| No. 2, Southern Cln'tl | 23.69 | 23.69 | 23.69 | 20.2007 |
| No. 2, Birmingham† | 20.38 | 20.38 | 20.38 | 15.50 |
| No. 2, foundry, Chicago* | 24.00 | 24.00 | 24.00 | 19.50 |
| Basic, del'd eastern Pa. | 25.26 | 25.26 | 25.26 | 20.8132 |
| Basic, Valley furnace | 23.50 | 23.50 | 23.50 | 19.00 |
| Malleable, Chicago* | 24.00 | 24.00 | 24.00 | 19.50 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 19.50 |
| L. S. charcoal, Chicago | 30.04 | 30.04 | 30.04 | 25.2528 |
| Ferromanganese, seab'd car- lots | 95.00 | 95.00 | 95.00 | 75.00 |

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 70 per cent or higher.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

| Per Gross Ton: | | | | |
|--------------------------------|---------|---------|---------|-----------|
| Heavy melting steel, P'gh.... | \$22.25 | \$22.75 | \$23.75 | \$15.75 |
| Heavy melting steel, Phila... | 19.75 | 20.75 | 20.25 | 13.75 |
| Heavy melting steel, Ch'go... | 20.25 | 20.75 | 21.25 | 14.37 1/2 |
| Carwheels, Chicago | 21.75 | 21.75 | 21.25 | 14.00 |
| Carwheels, Philadelphia | 21.25 | 21.75 | 20.00 | 14.75 |
| No. 1 cast, Pittsburgh | 20.25 | 20.25 | 19.75 | 15.25 |
| No. 1 cast, Philadelphia..... | 22.25 | 22.75 | 22.25 | 14.25 |
| No. 1 cast, Ch'go (net ton)... | 16.75 | 17.75 | 17.00 | 12.50 |
| No. 1 RR. wrot., Phila..... | 19.75 | 20.50 | 20.00 | 15.00 |
| No. 1 RR. wrot., Ch'go (net) | 18.00 | 18.50 | 19.00 | 13.00 |

Coke, Connellsville

| Per Net Ton at Oven: | | | | |
|----------------------------|--------|--------|--------|--------|
| Furnace coke, prompt | \$4.60 | \$4.60 | \$4.25 | \$3.65 |
| Foundry coke, prompt | 5.00 | 5.00 | 4.50 | 4.25 |

Metals

| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
|--------------------------------|-----------|-----------|-----------|-----------|
| Electrolytic copper, Conn. ... | 14.50 | 15.50 | 16.25 | 9.50 |
| Lake copper, New York..... | 14.62 1/2 | 15.62 1/2 | 16.37 1/2 | 9.62 1/2 |
| Tin (Straits), New York.... | 56.37 1/2 | 60.62 1/2 | 64.00 | 46.87 1/2 |
| Zinc, East St. Louis..... | 7.00 | 7.00 | 7.50 | 4.90 |
| Zinc, New York..... | 7.35 | 7.35 | 7.85 | 5.27 1/2 |
| Lead, St. Louis..... | 5.85 | 5.85 | 6.80 | 4.45 |
| Lead, New York..... | 6.00 | 6.00 | 6.95 | 4.60 |
| Antimony (Asiatic), N. Y.... | 17.00 | 17.00 | 17.90 | 13.50 |

The Iron Age Composite Prices

Finished Steel

| | |
|----------------|---------------|
| April 20, 1937 | 2.605c. a Lb. |
| One week ago | 2.605c. |
| One month ago | 2.605c. |
| One year ago | 2.097c. |

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

| | High | Low |
|-----------|--------------------|-------------------|
| 1937..... | 2.605c., Mar. 9; | 2.330c., Mar. 2 |
| 1936..... | 2.330c., Dec. 28; | 2.084c., Mar. 10 |
| 1935..... | 2.130c., Oct. 1; | 2.124c., Jan. 8 |
| 1934..... | 2.199c., April 24; | 2.008c., Jan. 2 |
| 1933..... | 2.015c., Oct. 3; | 1.867c., April 18 |
| 1932..... | 1.977c., Oct. 4; | 1.926c., Feb. 2 |
| 1931..... | 2.037c., Jan. 13; | 1.945c., Dec. 29 |
| 1930..... | 2.273c., Jan. 7; | 2.018c., Dec. 9 |
| 1929..... | 2.317c., April 2; | 2.273c., Oct. 29 |
| 1928..... | 2.286c., Dec. 11; | 2.217c., July 17 |
| 1927..... | 2.402c., Jan. 4; | 2.212c., Nov. 1 |

Pig Iron

| |
|---------------------|
| \$23.25 a Gross Ton |
| 23.25 |
| 23.25 |
| 18.84 |

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern Iron at Cincinnati.

| | High | Low |
|-----------------|------------------|-----|
| 23.25, Mar. 9; | \$20.25, Feb. 16 | |
| 19.73, Nov. 24; | 18.73, Aug. 11 | |
| 18.84, Nov. 5; | 17.83, May 14 | |
| 17.90, May 1; | 16.90, Jan. 27 | |
| 16.90, Dec. 5; | 13.56, Jan. 3 | |
| 14.81, Jan. 5; | 13.56, Dec. 6 | |
| 15.90, Jan. 6; | 14.79, Dec. 15 | |
| 18.21, Jan. 7; | 15.90, Dec. 16 | |
| 18.71, May 14; | 18.21, Dec. 17 | |
| 18.59, Nov. 27; | 17.04, July 24 | |
| 19.71, Jan. 4; | 17.54, Nov. 1 | |

Steel Scrap

| |
|---------------------|
| \$20.75 a Gross Ton |
| 21.42 |
| 21.75 |
| 14.63 |

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

| | High | Low |
|-------------------|-----------------|-----|
| \$21.92, Mar. 30; | \$17.92, Jan. 4 | |
| 17.75, Dec. 21; | 12.67, June 9 | |
| 13.42, Dec. 10; | 10.33, April 23 | |
| 13.00, Mar. 13; | 9.50, Sept. 25 | |
| 12.25, Aug. 8; | 6.75, Jan. 3 | |
| 8.50, Jan. 12; | 6.43, July 5 | |
| 11.33, Jan. 6; | 8.50, Dec. 29 | |
| 15.00, Feb. 18; | 11.25, Dec. 9 | |
| 17.58, Jan. 29; | 14.08, Dec. 3 | |
| 16.50, Dec. 31; | 13.08, July 2 | |
| 15.25, Jan. 11; | 13.08, Nov. 22 | |

Awards average about the same in number as has been the case for the past few weeks. The Concrete Steel Co. will supply 600 tons of concrete bars for the construction of a veterans' hospital at Kecoughton, Va.

Steel Sheet Piling

Current awards are few in number, with new inquiries showing no impressive totals. Carnegie-Illinois Steel Corp. has been awarded the contract for 450 tons of piling for the Middle Loop Public Power and Irrigation District, Arcadia, Neb. The Bureau of Reclamation will take bids on April 22 on 600 tons of steel sheet piling for the All-American Canal project. Bids have been closed on a bulkhead requiring 850 tons for the Jacob Riis Park, Queensboro, N. Y.

Plates and Shapes

Heavy plate and shape specifications are still being received in substantial volume, but both awards and inquiries in the past week have been considerably smaller in number and tonnage than previous periods. The American Bridge Co. has received a contract from the Bureau of Reclamation in Arizona and California for 2750 tons of plates and shapes to be used in the construction of regulating gates. This company will also supply 630 tons of material for a state bridge in Virginia. Plate specifications are holding up well, owing to the heavy volume of tank and railroad car construction. Plate deliveries are running from seven to 10 weeks, depending on the product.

Sheets

Specifications are off a little from the previous week, but the total volume booked so far this month is only about 33 per cent below the same period in March. Backlogs are a little easier on lighter gages of cold rolled sheets, with promises being made in six to eight weeks. Deliveries on galvanized and hot rolled annealed, however, are running from 22 to 23 weeks. The easier situation in cold rolled products is due to lighter demand from the automotive industry, but this picture could change over night when and if automobile makers make their final buys for the 1937 models. The breakneck pace exhibited in the sheet market for the past several months has evidently come to an end for the time being at least, although part of this slackening has been due to the refusal of producers to accept all tonnages presented to them. With spring programs of refrigerator and electrical appliance manufacturers well under way, additional orders from

these sources will be more on the nature of fill-ins to take care of underestimated requirements.

Strip

Backlogs are a little easier, with hot rolled strip being promised in four to six weeks and cold rolled in about six to seven weeks. Orders continue in fair volume with total bookings being within 20 to 30 per cent below shipments. There are no signs of any drastic fall-off in orders although the tendency is slightly downward. Producers will welcome this breathing spell as it is enabling them to satisfy some of the urgent requests for more prompt delivery. Fresh business for the most part is miscellaneous in character, although producers expect a considerable number of fill-in orders for those manufacturers who are well on their way with their spring program. Another buying move on the part of automobile manufacturers is expected before the changeover to new models is made.

Tubular Products

The movement of standard pipe from jobbers' warehouses to the trade was exceptionally heavy during March. Although this was to be expected in view of the price changes, the majority of this buying had its impetus from increased factory and home building. Although the total volume of tubular sales so far this month is considerably less than for the same period last month, the amount of new business in addition to backlogs is enough to keep pipe producers busy for the next two months at least. Oil-country specifications show no change from a week ago. Miscellaneous demand for line pipe is exceptionally good.

Wire Products

Production of wire products continues at a high level. About the most that can be said for current demand is that it is held in check only by the willingness of producers to accept bookings. Inquiries for manufacturers' wire and wire rods are heavy, but mills are still exercising their prerogative in keeping the order books from becoming topheavy. Demand for merchant wire items is a trifle better with consumption of these products picking up owing to seasonal influences. While no definite information has been forthcoming regarding price changes, it is not at all unlikely that some adjustments will be made in the near future.

Tin Plate

Both general line can and packers' specifications are exceptionally

heavy. With aggregate tin plate consumption considerably ahead of this time last year, it is becoming increasingly evident that tin plate production will show little change from the present 100 per cent rate throughout the remainder of the year, notwithstanding the fact that many new units for cold reducing are expected to be brought in this summer and early fall. Some producers will lose no time in scrapping old equipment as soon as new units are brought in. Meanwhile, miscellaneous uses for tin plate are continually on the up-grade, with prospects brighter than ever for export business in view of the European shortage of raw steel.

Coal and Coke

With the blowing in of some blast furnaces being held up owing to lack of coke, the situation in this market in the past week remains as tight as ever. Producers are just about able to meet their contract requirements. Spot furnace coke is bringing prices higher than current quotations, one sale having been made at \$4.90 a ton, f.o.b. Connellsville. Beehive foundry coke is not moving quite as fast as furnace coke. Coal production is comparatively light owing to the heavy stocking indulged in by consumers previous to April 1.



... Awards of 4045 tons
—5190 tons in new
projects.

AWARDS

Beverly, Mass., 350 tons, United Shoe Machinery Corp., to Joseph T. Ryerson & Son, Inc.

Philadelphia, 120 tons, hospital, to Bethlehem Steel Co.

Juniata County, Pa., 110 tons, bridge, to Bethlehem Steel Co.

Evansville, Ind., 300 tons, building for Mead Johnson Co., to Bethlehem Steel Co.

Ann Arbor, Mich., 250 tons, water purification plant, to Bethlehem Steel Co.

Grand Rapids, Mich., 230 tons, Grand Rapids Wholesale Grocery Co., to Jones & Laughlin Steel Corp.

Lansing, Mich., 320 tons, building for Sears Roebuck Co., to Truscon Steel Co.

Toledo, 200 tons, Wabash Railroad grade elimination, to Bethlehem Steel Co.

Kecoughton, Va., 600 tons, veterans' hospital, to Concrete Steel Co.

Sandstone, Minn., 800 tons, Federal jail, to Calumet Steel Co.

Chicago, 200 tons, Benson & Rixon store, to Inland Steel Co.

Sacramento, Cal., 440 tons, air depot supply building, to Concrete Engineering Co.

Oakland, Cal., 126 tons, Scottish Temple, to Kyle Co.

NEW REINFORCING BAR PROJECTS

Hempstead, N. Y., 500 tons, sewage treatment plant.

Lansing, Mich., 300 tons, building for J. W. Knapp Co. department store.

Detroit, 200 tons, building for Michigan Bell Telephone Co.

Topeka, Kan., 800 tons, bridge.

St. Paul, 300 tons, Northern States Power Co. building.

Pomona, Wash., 1600 tons, Bureau of Reclamation.

Buffalo, 150 tons, South Buffalo pumping station; bids taken by Buffalo Sewer Authority.

Davenport, Iowa, 400 tons, sewage treatment plant.

Chicago, 500 tons, Sanitary District sewers, projects No. 7B and 9.

Lincoln County, Colo., 103 tons, bridge; bids April 27.

Crockett, Cal., 138 tons, John Swett high school; bids opened.

Red Bluff, Cal., 195 tons, State bridge over Sacramento River; bids May 5.

Open-hearth operations last week consisted of 17 units—eight at Fairfield, four at Ensley and five at Gadsden. Blast furnace operations remain unchanged, with 16 active. The same schedules will be followed this week.

There is a shortage of foundry coke, owing to the heavy demands of the furnaces, and local producers are not in a position to make immediate shipments on new bookings. The price has been advanced \$1 to \$7.50.

The visit this week of T. M. Girdler, chairman of the Republic Steel Corp., is being anticipated with considerable interest as it is believed he will announce some new developments for the Gadsden works. These have been pending since December.

With a few exceptions, coal operations in Alabama have been at a standstill since March 30. A new contract has not yet been signed, but negotiations are in progress. Only one major producer, Alabama Fuel & Iron Co., is operating. This company is non-union.

Stockholders of Inland Steel Co. will vote April 27 on a proposal to offer 74,940 shares of capital stock to stockholders and to amend articles of incorporation to meet an offer of 26,050 shares to officers and employees. This proposal does not necessitate an increase in the authorized capital stock, which is now 1,600,000 of which 1,499,000 are outstanding.



... Steel mills pushed to production limits.

o o o

... Backlogs are not being reduced very much.

BIRMINGHAM, April 20.—The steel mills are still swamped with releases and likely will be for some time to come. Most mill units are being pushed to their production limits. Even at that, it is necessary in some cases to prorate tonnage. This has been going on for some weeks. In spite of the heavy production, backlogs continue high, as there is a fair flow of new business; this and the releases of specifications on identified projects are preventing much reduction of backlogs.

Similar conditions prevail in the pig iron market. Foundries are taking all the iron that can be produced. Only two furnaces that would normally operate are idle and one of these is scheduled to operate next month, the Gadsden furnace of the Gulf States Steel division of the Republic Steel Corp. April shipments are ahead of those for March.

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CHICAGO

... Ingot output moves up two points to 86 per cent of capacity.

o o o

... Sales are in good volume, but the situation is easier than in March.

o o o

... Railroad equipment market active; inquiries for more than 3500 cars.

CHICAGO, April 20.—Ingot production is again on the upward move, having gained two points to 86 per cent of capacity, which is the high point of the post-depression period. Specifications are the fourth best of the year and sales are in good volume, considering the size of books. Despite these favorable signs, there are market factors which give rise to the thought that the peak of the spring demand has been passed. There is no longer pressure in many lines for acceptance of third quarter tonnages and where such business is still offered mills study the case thoroughly because they want to be certain to give satisfactory service in that period to their old customers. Although deliveries are not improved, there is a note of ease in the minds of consumers as shown by less frantic entering of releases and a not-so-close follow-up on shipments. They give the impression that most of their immediate needs are assured either by stocks at hand or satisfactory deliveries from mills, and further, that they have crept slightly ahead of the market in the matter of finished parts and their stocks of consumer goods. This leads steel sellers to the conclusion that we are approaching a time when ultimate consumers must be given time to digest a surplus.

The railroad equipment market is again active, with new inquiries for over 3500 cars and with car builders and railroads seeking protection on sizable tonnages of car materials. Western railroads are particularly active, with building programs to be carried forward in their own shops.

Scrap prices are still soft, but market factors point to hardening which may be close at hand.

Pig Iron

April shipments are falling below the total for March, but the comparison must be made after taking into account the fact that the third month witnessed a heavy movement of low-priced iron, and also that this month's performance outshines both January and February. Sales during the month have been in exceptionally good volume, but by this date practically all needs except small spot lots have been covered. Talk of price advances has made no impression on local buyers, who at this time look for present quotations to hold through the coming quarter.

Reinforcing Bars

There is considerable speculation among dealers as to what they can expect from this market. Some of them fear that high labor and material prices are shutting off the investment type of building, leaving only public works, alterations, and plant additions to support the market. New developments of size are a Federal jail, which is taking 800 tons, and sewage treating plants at Davenport, Iowa, and Chicago. All other inquiries and lettings are small. The Carrel Steel Co. has been formed here and it will roll reinforcing bars as one of its products.

Warehouse Business

April business, though below that of March, is surprisingly good and far better than warehousemen expected. While all commodities are moving in good tonnages, sheet demand is far in the lead and some qualities and certain gages are no longer to be had. Seasonal influences are running

true to form and are bringing larger demand for the heavier sections.

Wire Products

There is a general slackening in the rate of entering specifications and sellers have come to the conclusion that the peak of the spring demand has been passed. Consumers overbought and overspecified and they now are at the point where they are digesting these accumulations. There is also evidence that manufactured parts as well as completed consumers goods are ahead of the market and that they are also in a period of digestion. The comfort of wire consumers is best illustrated by the fact that interest in forward buying has disappeared and no third quarter business is being offered. Sales in farm areas are spotty and producers have started a drive to get more tonnage. Wire mill operations remain at practical capacity and backlogs are of good size.

Rails

Secondary rail buying is still rather difficult to visualize, but mills expect that it will develop during, if not before the summer months. Mills are shipping at their practical rating. Spot accessory business is in fair volume and there is moderate activity in light rails.

Bars

Spot sales are in good volume, but there is not the rush that prevailed during the opening days of the month. Farm implement manufacturers have made some sizable purchases in recent days and tractor plants and forgers are still interested in the market. Protection is being sought for additional tonnages for contemplated railroad equipment, and shipments to automobile plants are excellent. However, throughout most phases of the market there is a note of less emergency, which may give the key to the drift of conditions which will prevail during the summer months. There is no improvement in bar deliveries.

Sheets

Users are still offering third quarter tonnages, but mills are showing little interest while they work hard to ascertain the probable third quarter requirements of their principal customers, the desire being not to make commitments that might stand in the way of the service expected by old friends. With operations at full capacity, producers are having trouble in meeting the requirements

of some large consumers, notably railroad car builders who were late in getting into the market for some of their tonnages.

Structural Material

This market is very dull and not a great deal can be expected of the future as based on projects that are now in sight. The trouble is that investment money is not going into the building field and the reasons are taxes, high labor and material costs, a lagging rent situation and consequent low return on capital. The few large jobs that are pending represent expenditure of tax money, private work being confined to necessary alterations and additions of small size.

Plates

Demand bolstered by recent railroad equipment buying, projected plans for new cars and locomotives, and the oil industry gives the plate market a bright outlook. The Baltimore & Ohio will buy 2000 hoppers, the Chesapeake & Ohio 500 hoppers and the Central of Brazil 1000 freight cars. The Union Pacific is seeking protection on 12,000 tons of car steel. The Burlington will build 2000 box, 500 hopper cars and 14 locomotives in its shops. From Texas come inquiries for 2500 tons of steel for oil derricks and general refinery equipment.



... **Pig iron shipments still heavy.**

... **Steel operations hold to recent high level.**

BUFFALO, April 20.—Pig iron shipments are holding up, producers report, and while most melters are covered for the quarter, there is some additional buying as required. Makers do not look for any heavy buying before books are opened for the next quarter.

Steel mill operations remain as before, with Bethlehem's Lackawanna plant operating 28 and 29 out of 30; Republic, eight out of 9 and Wickwire-Spencer Steel Co., three out of four.

Steel fabricators are interested in State bridge jobs, one in Broome County to require 175 tons of structural steel and one in Jefferson

County to take 115 tons of structural. Bids will be taken this week for the 250-ton New York Central crossing elimination job at Jordan, N. Y. Bids will be taken April 27 for the two State bridge jobs.

The South Buffalo pumping station in connection with the new sewer system will require between 100 and 200 tons of reinforcing bars, in addition to the structural tonnage already reported.



... **Sheet sales for third quarter continue.**

... **Ingot output holds at 90 per cent.**

CINCINNATI, April 20.—No easing in sheet steel demand is reported, as consumers order for third quarter at prices in effect then. Forward buying is being held to regular customers, and a policy of prorating to insure equitable distribution is being followed to a certain extent. Rolling schedules are at 100 per cent in all units, and traces of flood damage have been thoroughly erased.

Producers maintain ingot steel output at above 90 per cent. Only five open-hearths are idle.

Pig iron sales are small and confined to urgent needs. Melters are carrying fair inventories as result of heavy specifications on first quarter contracts.



... **Orders decline but are still in good volume.**

... **Mills booking business for the third quarter.**

ST. LOUIS, April 20.—Within the last week a recession in the volume of orders for sheets and plates has been noted, but business is still fairly heavy, with sheets continuing to lead. Orders are be-

ing accepted for shipment well into the third quarter. Warehouse business continues heavy. Resale prices are firm.

The Crown Cork & Seal Co. has awarded 460 tons of structural steel to the Bethlehem Steel Co. The Otis Elevator Co. and the Mississippi Valley Structural Steel Co. are furnishing 100 tons of structural shapes each for an escalator extension in a department store here. The Pittsburgh Plate Glass Co. is inquiring for 750 tons of structural shapes for a building to be erected at Crystal City, Mo. The State of Missouri will open bids May 1 for five highway bridges requiring 215 tons of structural steel.

Strikes in the larger electrical manufacturing plants in St. Louis have had the effect of slowing down operations in local jobbing foundries. Otherwise, there has been no let-up in the melt of pig iron in the St. Louis area. Shipments are holding up strong, but there is very little new buying, because of heavy commitments before the advance in prices.

Ingot operations continue at 90 per cent of capacity.



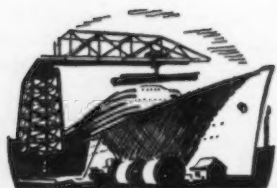
... **European country offers \$28 for pig iron.**

BOSTON, April 20.—Pig iron continues to move in small quantities. Furnaces are not soliciting business as a rule, however. Foreign buyers are still endeavoring to place business in this country. A northern European country is offering \$28 a ton on dock here for 1000 tons.

Warehouses are now quoting round and flat forged bars at \$6.50 per 100 lb., delivered in metropolitan Boston, an advance of 60c.

The cast iron pipe market has come to life again. Several round tonnages were placed the past week, and the carlot business is quite brisk.

The bulk of current reinforcing steel bar business is in small lots, for which sellers are obtaining full list prices. The steel fabricating market is a shade more active. Maine and New Hampshire will shortly ask bids on a half dozen or so bridges, and Massachusetts on four.



.. PHILADELPHIA ..

... *New business continues less than last month.*

o o o

... *No reduction in backlogs is yet apparent, however.*

o o o

... *Operations are unchanged; scrap prices off 50c to \$1 a ton.*

PHILADELPHIA, April 20.—New business is less than that of the comparable period last month although orders are generally exceeding shipments, and backlogs have not been reduced. Operations are unchanged at 67½ per cent of capacity.

Few sellers are quoting currently except for long range shipment, and the problem of deliveries is foremost in their minds. Some indication is apparent of a slightly easier delivery situation, although this tendency is not sufficiently general to warrant emphasis. This fact, however, may be partly responsible for the decline in the volume of specifications, since it is known that many orders were placed upon the books farther in advance than usual as a precaution against congested shipping schedules. It is commonly believed that this decline has been caused either by reason of the release of such orders or by a slight amount of buying in excess of needs for a variety of reasons, including worry over prices, labor and the political situation. In this connection, however, it must be stated that inquiries and interest on the part of consumers are still greatly in evidence. A further price advance is not believed likely here, except in pig iron circles, where such a move is not considered improbable. The starting up of the Riddlesburg blast furnace next month will be an aid to buyers who thus far have been unable to contract for all their requirements.

Scrap prices have declined for the first time since Nov. 10, 1936.

Pig Iron

The Riddlesburg, Pa., stack of the Colonial Iron Co. will resume

operations during the early part of May, according to Hickman, Williams & Co., sales agents. All contracts covering ore, coke, limestone, etc., have been executed and the supply is assured. Foundry iron will first be produced, while a considerable tonnage of basic will follow as soon as operating conditions shall permit, probably in two or three weeks. Estimated production is about 6500 tons monthly, and eastern Pennsylvania consumers who have been clamoring for speedier shipments and more iron for the past few months will likely have a source of supply for a time at least. Other than the output of this furnace little iron will be available in the district until next quarter. Shipments are lighter than last week and may tend downward for the next month.

Plates and Shapes

Deliveries of flat-rolled products are no better, although some easing is noticed in the rate of incoming plate business. Sheets generally are still in as much demand as ever, with the exception of cold rolled. The sale of more than 150 tons of plates out of warehouse has been reported, the full warehouse price being paid. One mill is reputed to be booking no orders beyond July so as to be in a position to offer spot delivery and capitalize thereby.

Shapes and Bars

Both awards and inquiries are light this week, the largest of the former being a 225-ton job which went to Belmont Iron Works for a Celanese Corp. building at Amselle,

Md. An airplane hangar at Harrisburg, requiring 150 tons, will be up for bids April 28. A Philadelphia hospital, taking 120 tons of bars, and a Juniata, Pa., county bridge, requiring 110 tons, were awarded to Bethlehem Steel Co.

Imports

The following iron and steel imports were received here during the past week: 1199 tons of pig iron from British India; 40 tons of ferromanganese from Japan; 2509 tons of chrome ore from South Africa; 61 tons of steel billets, 62 tons of steel forgings, 66 tons of steel tubes and 78 tons of steel bars from Sweden, and nine tons of manganese ore from France.

\$3 Rate on Pig Iron Ashland to Butler

WASHINGTON, April 20.—The Interstate Commerce Commission today granted authority to the Chesapeake & Ohio Railroad and its rail connections to establish a rate of \$3 a ton on pig iron from Ashland, Ky., to Butler, Pa., without observing the long-and-short-haul provision of the Interstate Commerce Act. From Ashland to Butler, the distance over the shortest working route is 334 miles and the rate is \$3.60 a ton. Relief from the present rate was asked in order to meet water competition. In applying for relief the railroads said that there will be an annual movement of about 100,000 tons of pig iron from Ashland to Butler. The commission report said that approximately 10,000 tons has already moved by the American Barge Line to Pittsburgh and rail beyond at a charge of \$2.98.

The commission has found not justified proposed increased rates on iron and steel railroad material, in carloads, to, from and between points in the Southwest. The material involved consists of steel articles made for use in building and repairing railroad tracks, locomotives and cars. Southwestern railroads had filed schedules to cancel specific commodity rates and to establish rates made 32.5 per cent of the first class rate.

Industrial Engineering & Mfg. Corp., manufacturer of slide rules, micrometers, scales and tools, recently moved from 239 John Street to new and larger building at 247 Connecticut Avenue, Bridgeport, Conn. E. Kottsieper is president.



RAILROAD BUYING

Bangor & Aroostook contemplates the purchase of six steam locomotives.

Aliquippa & Southern has ordered two steam switching locomotives of 0-8-0 type from American Locomotive Co.

Milwaukee Road will build in its own shops 500 50-ton hopper cars, 500 50-ton automobile cars, 1000 automobile cars and 22 dump cars. Work has been started in its shops on modernization and air-conditioning of 30 coaches and construction of seven dining cars, one mail-express and five coach-baggage cars.

The Burlington plans to build 2000 box cars, 500 hopper cars and 14 locomotives in its shop.

Baltimore & Ohio will buy 2000 hopper cars.

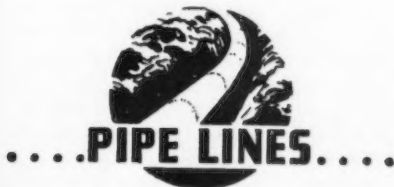
Chesapeake & Ohio will purchase 500 hopper cars.

Union Pacific is inquiring for 12,000 tons of steel for cars it will build in its shops.

Central of Brazil is in the market for 1000 freight cars.

Pennsylvania Railroad has officially confirmed information published in the April 8 issue of *The Iron Age* that it will construct in its Altoona, Pa., works 2800 new freight cars, and also chasses for 11 new electric passenger locomotives of heaviest design. These locomotives will be assembled at Altoona with electrical parts supplied by electrical manufacturing companies. Total cost of the new equipment will be slightly in excess of \$10,750,000. The cars will consist of 1000 50-ft. double-door box cars adapted to transportation of general freight, including automobiles; 1500 52-ft. mill-type gondola cars of 70-ton capacity, designed for general mill service and specially suited to handling pipe, structural steel and other heavy products, and 300 covered weatherproof hopper cars for carrying in bulk, and without barreling or packaging, cement and other commodities requiring protection from the weather.

American Car & Foundry Motors Co. has received the following orders for motor coaches powered with Hall-Scott horizontal engine: Seven 35-passenger coaches for Alexandria, Barcroft & Washington Transit Co., Alexandria, Va.; four 36-passenger coaches for Illinois Safeway Lines, Chicago; one 36-passenger coach for Denver, Colorado Springs & Pueblo Motor Way, Denver; one 28-passenger coach for Santa Fe Trails of Illinois, Inc., Chicago; two 36-passenger coaches and one 37-passenger coach for Santa Fe Trails Transportation Co., Wichita, Kan., and one 30-passenger coach for Pittsburgh Motor Coach Co., Pittsburgh.



PIPE LINES

Channel Gas Co., Houston, Tex., plans welded steel pipe line from gas field near Dickinson, Tex., to Houston city limits, about 30 miles, for natural gas transmission. Company has secured franchise for gas supply in municipal limits and will build distributing lines with control station and other operating facilities. Compressor booster plants will be installed at points along main transmission line. Entire project will cost about \$250,000.

Rochester Gas & Electric Corp., 89 East Avenue, Rochester, N. Y., plans steel pipe line to Scottsville, N. Y., and vicinity for gas transmission, including distributing lines. Company also will make extensions in pipe line distributing systems at Chili, Greece, Gates and neighboring points. Cost over \$75,000.

Wolverine Natural Gas Corp., Grand Rapids, Mich., plans extensions in steel pipe line gathering and distribution system in tri-county natural gas field in Mecota-Montcalm district, in connection with purchase of 24 gas wells in such field from Gordon Oil Co., with capacity of close to 50,000,000 cu. ft. daily. Acquisition will give Wolverine company a total of 33 gas producers in area noted and additional facilities will be provided later for welded steel pipe line distance transmission.

United States Engineer Office, Vicksburg, Miss., asks bids until May 13 for 3260 ft. of 1½ to 5-in. wrought steel pipe, 760 ft. of 1½ to 1½-in. wrought steel pipe, and 1000 ft. of 1½ and ¾-in. galvanized steel pipe (Circular 228).

J. Edward Jones, 256 Stoner Avenue, Shreveport, La., is at head of project to build 6-in. welded steel pipe line in Rodessa, La., oil field for oil transmission to new gasoline refinery to be built in that area.

Great Lakes Pipe Line Co., Tulsa, Okla., has approved an expansion and improvement program in welded steel pipe line system, including new 8-in. line from refinery at Barnsdall, Okla., to Kansas City, Mo., for gasoline transmission, paralleling an existing welded steel pipe line between the two places; new 6-in. welded steel pipe line loop from Des Moines, Iowa, north to Minneapolis and south to St. Louis, and new 6-in. line from connection with gasoline transmission line at Osceola, Iowa, to Omaha, Neb., and vicinity, about 100 miles, replacing an existing 4-in. line between these two points.

Otter River Gas Corp., Tillsonburg, Ont., plans new welded steel pipe line from Tillsonburg to Kitchener, Ont., for natural gas transmission. Cost over \$100,000. Lansing Rodgers, Tillsonburg, is company engineer.

Alderwood Manor, Wash., Water District has opened bids on 922 tons of 2 to 10-in. steel pipe.



CAST IRON PIPE

Lawrence, Mass., has awarded 400 tons of pipe and fittings to Warren Foundry & Pipe Corp.

Northampton, Mass., is in the market for 100 tons of 6 and 8-in. pipe.

Milton, Mass., has placed 200 tons of 6 to 12-in. with Warren Foundry & Pipe Corp.

Kittery, Me., has placed 157 tons of 6-in. with R. D. Wood Co.

Quincy, Mass., has purchased 130 tons of 6 to 12-in. from Warren Foundry & Pipe Corp.

Westerly, R. I., will shortly be in the market for pipe. It plans to spend \$113,000 on a water system. Weston & Sampson, 14 Beacon Street, Boston, are the engineers.

Lowell, Mass., has placed 120 tons of 12-in. with Warren Foundry & Pipe Corp.

Woburn, Mass., plans extensions in pipe lines for water system. Cost about \$45,800. Fund has been secured through Federal aid.

Wheeling, W. Va., plans pipe lines for water system in Pike district. Fund of \$91,000 is being arranged through Federal aid for this and other waterworks facilities.

Tampa, Fla., plans pipe lines for extensions in water system, including replacements and improvements in present distributing lines. Fund of \$230,000 has been arranged through Federal aid.

Waskom, Tex., plans pipe lines for water system and other waterworks installation. Bond issue of \$60,000 has been approved for this and sewerage system.

Salem, Ore., plans pipe lines for extensions and replacements in water system. Financing in amount of \$800,000 is being considered for this and other waterworks installation. Preliminary plans and surveys have been made by Stevens & Koon, Spalding Building, Portland, consulting engineers.

Mercer, Wis., plans pipe lines for water system. Fund of \$90,000 is being arranged through Federal aid for this and other waterworks installation, including pumping station, and for sewerage system.

Orfordville, Wis., plans pipe lines for water system and other waterworks installation. Fund of \$60,000 is being arranged for this and municipal sewerage system, of which \$20,000 will be through bond issue, approved at recent election, and remainder through Federal aid.

Board of County Commissioners, Towson, Md., closes bids April 26 for 52,200 ft. of 6 to 16-in. for water supply line on Reisters-town Road.

College Corner, Ohio, plans pipe lines for water system. Fund of \$30,000 is being arranged for this and other waterworks installation, including pumping station.

Bellingham, Wash., is considering recommendations of John W. Cunningham, Spalding Building, Portland, consulting engineer, recently engaged to make survey of water system, for new 48-in. trunk line from Lake Whatcom to waterfront area, to cost \$700,000 with intake and other accessory construction; also for 52-in. trunk line from South Fork of Nooksack River to Mirror Lake, including canal from latter point to Lake Whatcom, total cost about \$535,000. John Adams is water superintendent.

Russell, Kan., has authorized bond issue of \$127,700 for extensions and improvements in water system, including main trunk line from water source on Smoky Hill River to Fossil Creek reservoir, with new pumping station. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Santa Ana, Cal., will open bids May 3 on 180 tons of various sizes.

Los Angeles Department of Water and Power will open bids April 28 on 967 tons of 8, 12, and 16-in. for water systems.



CANADA

... General Motors strike causes unsettlement.

TORONTO, April 20. — Some slowing down in business was noted in the Canadian iron and steel markets the past week, largely due to unsettlement caused by labor troubles at the Oshawa plant of General Motors Corp. While it was expected that a settlement would be reached before the end of last week, no agreement has been made and in some circles it is expected that the strike may swing to other branches of industry. Labor troubles have affected both spot and future delivery business in iron and steel, but sales in fair volume continue to appear. Export demand for steel is sustained, and some large contracts have been closed. Steel mills are actively engaged on rail orders, and car and locomotive plants are working on contracts, with indications of continued business at capacity rates for several months. While mining operations are active, some difficulty has arisen in financing new developments due both to the sharp break in stock market prices and the announced proposed new regulations of the Ontario Securities Commissioner.

Demand for iron and steel scrap continues heavy, with scarcity reported in many lines.



... CLEVELAND ...

... *New business lighter; almost equal shipments.*

... ..

... *Ingot output 12 higher in Cleveland-Lorain.*

CLEVELAND, April 20.—New demand for finished steel is being maintained at around the somewhat reduced volume established early in the month, but mills are still getting orders for nearly as much tonnage as they are shipping, so that reductions in backlogs have not been sufficient to make an appreciable effect on deliveries. Some mills report that their April business has fallen only 10 per cent behind shipments and others probably are not making greater gains in reducing their backlogs. Ingot output jumped 12 points to 87 per cent of capacity in the Cleveland-Lorain district this week. In the Youngstown district there was a one point gain to 90 per cent of capacity. The second American Steel & Wire Co. blast furnace in Cleveland has been blown in and also the rebuilt Republic stack at the Corrigan, McKinney plant, these making with the starting up of a furnace at Lorain three additions this month to the operating stacks in the Cleveland-Lorain district.

Forward buying is being restricted to some extent by the filled-up condition of order books for the second quarter and the general policy of mills to take no new business except in sheets and strip steel for the third quarter, subject to prices prevailing at time of shipment. Mills have little available space in their rolling schedules for any products for June shipment. Consumers are anxious to have third quarter prices named, but these may not be announced until around May 20. In the meantime the belief has become quite well established that there will be no general price advance for the coming quarter. However, there is talk of advances on wire products, which are declared to be entirely too low.

With ore stocks rapidly dwindling, Lake navigation has opened with an unprecedented rush of cargoes down the Lakes. During a 24-hr. period up to Monday night 22 cargoes were dispatched from

the Duluth-Superior docks. The first cargo from Duluth reached a Lake Erie port today, being preceded Saturday by the first cargo from a Lake Michigan port.

Pig Iron

The market continues quite active, with sales in lots up to 1000 tons and more. Some of the larger orders are from the motor car, agricultural implement and heating equipment industries. Iron is being consumed at a heavy rate, but shipments have declined from March, when foundries were taking out their lower priced first quarter iron. Some foundries having reduced their stocks considerably are now making new purchases and others that had previously bought some iron for the current quarter are making additional purchases.

Sheets

Miscellaneous demand continues quite active, bookings being at about the same volume as shipments, so that backlogs are not being reduced or deliveries improved. Mills are becoming well filled for the third quarter. Small-lot inquiries are coming from some consumers who need more sheets for the current quarter and mills in some cases are entering a little more tonnage for delivery in this quarter, but at the same time are trying to avoid making commitments at second quarter prices beyond their productive capacity for the quarter. With deliveries generally extended well into the third quarter, consumers continue to anticipate their requirements for that delivery by placing orders subject to prices prevailing at the time of shipment. Heavy shipments are being taken by motor car manufacturers, but no new purchases in sizable lots have come from that source for a few weeks.

Iron Ore

With ore stocks lower than at any previous time in many years and fresh supplies needed by many

blast furnaces, a large fleet of Lake boats is fighting severe ice conditions in Lake Superior to get down early cargoes. Water shipments this month may break all April records. Ore stocks at furnaces and Lake Erie docks on April 1 were cut to 17,437,306 tons, a reduction of 5,496,127 tons. The amount at furnaces on that date was 14,585,355 tons. If no ore were shipped in April, stocks would be around 12,000,000 tons on May 1. More ore was consumed in March than in any month since October, 1929, the amount melted being 5,142,496 tons, or an increase of 699,190 tons over February. There were 150 furnaces in blast using Lake ore on March 31, an increase of four for the month.

Strip Steel

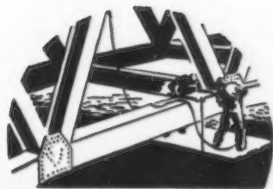
New demand is only moderate but mills do not appear to be gaining on deliveries. Automobile parts plants are buying small lots. While mills are well filled for the second quarter, some consumers who had deferred buying for all their second quarter requirements have come into the market and so far have been able to place orders for June shipment.

Bolts and Nuts

Shipments are heavy and are expected in April to reach the record-breaking month of March. However, sales which were stimulated last month by the second quarter price advance have fallen off this month, although a fair amount of business has been taken at the new prices. Makers report that prices are being better maintained than for a long time. Nearly all of the orders booked at first quarter prices have been shipped.

Bars, Plates and Shapes

Bars continue in good demand from forge shops and other makers of automobile parts and from miscellaneous consumers. Some of the mills are getting their rolling schedules about filled for June. Reinforcing bars are in good demand for identified projects, specifications for which must be received by April 30, but new business at the second quarter prices is rather light. Plates continue quite active, with deliveries ranging from 10 to 12 weeks. Mills are filled with structural shape orders until late in June. Building projects requiring less than 100 tons are fairly numerous, but there is a scarcity of larger projects. A grade crossing elimination in Toledo requiring 650 tons has been placed with the Bethlehem Steel Co. and Lake front bridges in Cleveland requiring 700 tons have been awarded to the American Bridge Co.



FABRICATED STEEL

... Lettings decline to 14,200 tons from 42,300 tons last week.

o o o

... New projects slightly higher at 14,120 tons compared with 12,000 tons a week ago.

NORTH ATLANTIC STATES

Montpelier, Vt., 150 tons, Tabor overpass, to Vermont Structural Steel Corp., Burlington, Vt.

Lynn, Mass., 100 tons, store, to New England Structural Co., Everett, Mass.

New York, 130 tons, building at 112 West 31st Street, to Fassler Iron Works.

Queens, N. Y., 250 tons, World's Fair bridge, to American Bridge Co.

Verona, N. Y., 295 tons, grade crossing elimination, to American Bridge Co.

Yonkers, N. Y., 550 tons, Habirshaw Electric Co. building, to Harris Structural Steel Co.

Port Byron, N. Y., 360 tons, school building, to F. L. Hughes Co., Inc., Rochester, N. Y.

Evans City, Pa., 110 tons, high school, to Guilbert Steel Co., Pittsburgh.

Altoona, Pa., 130 tons, McCrory store, to Altoona Pipe & Steel Co.

Montgomery, Pa., 470 tons, State highway bridge, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

Amselle, Md., 225 tons, Celanese Corp. building, to Belmont Iron Works.

Curtis Bay, Md., 195 tons, ordnance building, to Maryland Steel Products Co.

SOUTH AND SOUTHWEST

Alexandria, Va., 705 tons, highway bridge, to American Bridge Co.

Pumpkinvine Creek, Ga., 285 tons, Seaboard Air Line viaduct, to Virginia Bridge Co., Roanoke, Va.

Phoenix, Ariz., 240 tons, J. J. Newberry Co. store, to Bethlehem Steel Co.

CENTRAL STATES

West Branch, Mich., 125 tons, bridge, to American Bridge Co.

Springfield, Ohio, 400 tons, Ohio Edison Co. plant addition, to Whitehead & Kales Co., Detroit.

Toledo, Ohio, 650 tons, grade crossing elimination, to Bethlehem Steel Co.

Cleveland, 700 tons, Lake Front Boulevard bridges, Federal project, to American Bridge Co.

Cleveland, 150 tons, Lorain Street theater, to Builders Structural Steel Co.

State of Ohio, 155 tons, power station, to Fort Pitt Bridge Works Co.

Chicago, 225 tons, Alco gravure building, to Joseph T. Ryerson & Son, Inc.

Streator, Ill., 200 tons, factory addition, Owens-Illinois Glass Co., to Bethlehem Steel Co.

Sangamon County, Ill., 240 tons, bridge, to Fort Pitt Bridge Co.

Peoria, Ill., 500 tons, addition to power house, Central Illinois Light Co., to Whitehead & Kales.

Barber County, Kan., 145 tons, bridge, to Ben Sibbitt Iron & Foundry Co., Wichita, Kan.

Butler County, Kan., 210 tons, bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

Pawnee County, Kan., 135 tons, bridge, to George C. Christopher & Son Co., Wichita, Kan.

Craig, Mo., 240 tons, girder bridge, to American Bridge Co.

St. Louis, 460 tons, factory for Crown Can & Seal Co., to Bethlehem Steel Co.

St. Louis, 100 tons, escalator extension for May Department Stores Co., to Mississippi Valley Structural Steel Co.

Burlington Railroad, 225 tons, beam spans, to American Bridge Co.

WESTERN STATES

Aroya, Colo., 300 tons, State bridges, to Minneapolis-Moline Power Implement Co.

Arizona and California, 2750 tons, regulating gates, Spec. No. 722, Bureau of Reclamation, to American Bridge Co.

San Francisco, 2072 tons, superstructure for San Francisco-Oakland Bay bridge, to Columbia Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Lee, Mass., 250 tons, finishing room building, Smith Paper Co.

New York, 850 tons, public school No. 68.

New York, 650 tons, public school No. 113.

Brooklyn, 450 tons, public school No. 226, addition.

Borough of Queens, N. Y., 500 tons, bulkhead, Jacob Riis Park.

Albany, N. Y., 450 tons, Kresge store; John Harold Barry, New York, architect.

Syracuse, N. Y., 230 tons, pure foods building, New York State Industrial Exhibit Authority.

Suffern, N. Y., 250 tons, Good Samaritan hospital building.

Broome County, N. Y., 175 tons, State highway bridge; bids April 27.

Jefferson County, N. Y., 115 tons, State highway bridge; bids April 27.

Newark, N. J., 750 tons, highway bridge.

Pittsburgh, 250 tons, bridge repairs, Pittsburgh & West Virginia Railway Co.

Pittsburgh, 800 tons, boiler room framing and turbine supports for Duquesne Light Co.

Erie, Pa., 370 tons, court house.

Harrisburg, Pa., 150 tons, airplane hangar; bids April 28.

Salisbury, Md., 125 tons, Montgomery Ward & Co. store.

THE SOUTH

Kenova, W. Va., 220 tons, underpass.

Miami, Fla., 440 tons, outfall sewer.

Houston, Tex., 700 tons, oil derricks.

Texas City, Tex., 500 tons, furnace for Standard Oil Co.

Corpus Christi, Tex., 1500 tons, tank and refinery equipment.

State of Mississippi, 1180 tons, bridges.

New Orleans, 300 tons, Charity Hospital; R. P. Farnsworth & Co., contractors.

CENTRAL STATES

Grand Rapids, Mich., 240 tons, crane runway, Hayes Body Co.

Madison, Wis., 100 tons, hangar, municipal airport; bids close April 26.

Groton, S. D., 460 tons, overhead bridge.

Crystal City, Mo., 750 tons, building for Pittsburgh Plate Glass Co.

State of Missouri, 215 tons, highway projects; bids May 1.

WESTERN STATES

Lincoln County, Colo., 150 tons, bridge; bids April 27.

Red Bluff, Cal., 500 tons, State bridge over Sacramento River; bids May 5.

Potholes, Cal., 500 tons, trash rack for Imperial Dam.

FABRICATED PLATES

AWARDS

South Boston, Mass., 456 tons, four oil storage tanks for White Fuel Corp., to Graver Tank & Mfg. Co.

Ecorse, Mich., 1715 tons, fabricated pipe for Great Lakes Steel Corp., to Semet-Solvay Co.

SHEET PILING

AWARDS

Arcadia, Neb., 450 tons, Middle Loop public power and irrigation district, to Carnegie-Illinois Steel Corp.

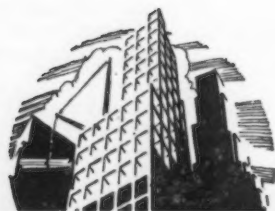
SHEET PILING

NEW PROJECTS

Milwaukee, 450 tons, United States Engineer Office, for delivery at Kaukauna, Wis.; bids closed April 19.

Quigley Offers New Refractories

QUIGLEY CO., 56 West 45th Street, New York, has developed a comprehensive group of eleven insulating refractories, made from Insuline, a new calcined fire clay base material of minute cellular structure. In addition to high insulating qualities, Insuline products (available in block, brick, plastic and castable materials) possess the properties of light weight and extremely low heat storage capacity.



... NEW YORK ...

... *Current business volume satisfactory though well below recent peak.*

o o o

... *Considerable tonnage being placed for third quarter shipment.*

o o o

... *No official intimations as yet as to prices for next quarter.*

NEW YORK, April 20.—Current steel business, while below the volume of March by a wide margin, is holding up at a very fair rate, considering the small amount of steel of any kind that is available for second quarter shipment. Orders can still be taken for pipe, for certain sizes of bars and for other miscellaneous items for May or June shipment, but a good deal of the current bookings are third quarter reservations. In at least one instance a reservation for a good-sized tonnage of sheets has been made by a mill for fourth quarter.

While the sales tension that existed during the first quarter has to a great extent been relieved, the production situation is little changed. Mills are putting on all possible speed to clear their books as quickly as possible of the lower-priced tonnage they carried over into this quarter. Shortages of raw materials are still hampering some companies in their operations.

Very little information is available as to prices that will be announced for third quarter. Opinion in the trade, however, leans to the view that present prices will be continued without material change into the next quarter.

The Bethlehem Shipbuilding Corp. was low bidder on three ships to be built for the Panama Railroad Steamship Co. The Bethlehem company agreed to build the three ships for \$4,040,000 each provided all are built at the Fore River yard at Quincy, Mass. The line is owned by the Federal Government.

Pig Iron

An export inquiry for 70,000 tons of ordinary foundry grade and

one for 40,000 tons of IX foundry iron were received here last week. Foreign inquiry for smaller amounts is plentiful. While able to satisfy only a portion of this business at present due to their sold up position, producers appear interested in extended delivery contracts. An obstacle to foreign ship-

World's Fair Reports Rapid Progress

CONSTRUCTION activity is making rapid headway at the New York World's Fair, in the past week bids having been taken for the erection of the block-long administration building and two permanent bridges across Grand Central Parkway Extension.

Low bids for the administration building totaled \$402,645 for four contracts, as compared with engineers' estimates of \$467,500. Foundations of the building have been completed and purchases of steel are said to have been made under previous contracts. Grover Whalen, president of the fair corporation, pointed out that the amount of these contracts plus those bid on for the building—a total of \$514,981—compared “most favorably with the \$900,000 allowed in the fair's budget for the building.” Work already completed includes test boring and test piles; piles; foundation construction; structural steel; test building, and foundation design. The administration building will occupy an unusual-shaped structure spreading over more than a city block of

ment, however, is the shortage of available ocean freight space, together with the high rates prevailing. On recent shipments to Japan a rate as high as \$13 has been quoted, whereas \$7 or \$8 rates were obtainable not long ago. Domestic sales of pig iron for prompt shipment showed a moderate increase during the week, but large buyers continued inactive. Releases are heavy, and indicate that business with the foundries is holding up well. Both the Mystic furnace at Everett, Mass., and the stack at Troy, N. Y., are expected back in blast by about the first week in May.

Reinforcing Steel

The only award of size to be reported this week was 350 tons to Fireproof Products Co. for the foundation of a bridge over the Flushing River. An additional small tonnage is expected to be required for the superstructure which has not yet been up for bids. The other projects pending last week are still not settled, so that about 1000 tons is awaiting disposal. Little of importance is seen in the near future, although quite an impetus has been given construction in the past few weeks. Most of this work consists of lots of 50 tons or less.

ground. It will be two stories high and will incorporate the latest developments in modern suburban-type office building construction. It will be faced with stucco and will include in addition to offices, executive rooms and board rooms, a dining room, cafeteria, kitchens and a large two-story entrance hall, which will serve as an exhibit room during the pre-fair period.

A low bid of \$103,261.50 was submitted for the construction of the two bridges. Each will carry a 24-ft. roadway and will be of steel girder construction with concrete deck and masonry piers. Total length of 257 ft. 5 in. will be divided into four full spans with a half span at each end cantilevered to the abutment from the adjacent pier. Work will begin immediately on award of the contract and completion is expected by the middle of August.

Publication of the 30th annual edition of Metal Statistics is announced by the American Metal Market. The usual abundant data on production, consumption, shipments, prices, etc., in the non-ferrous and ferrous metal industries are augmented this year by several important additions.

Finishing Operations on Vacuum Cleaner Parts

(CONTINUED FROM PAGE 47)

clean at a uniform temperature and a slight atmospheric pressure is maintained by an air replacement system which delivers 60,000 cu. ft. of filtered warm air per minute into the room. This replaces the contaminated air exhausted by fans from the spray booths, oven and pickling tanks.

To assure uniformity of the finish a constant temperature of 75 to 80 deg. is maintained in the room. The temperature is kept within this rather high range so that there is no danger of its exceeding the maximum during the hot summer days. The air is distributed in the room from a large sheet metal duct located above the conveyor that encircles the baking oven.



...SAN FRANCISCO...

... Construction work has dropped considerably.

SAN FRANCISCO, April 19. — Two water supply projects held major interest in a quiet market last week. At Alderwood Manor, Wash., bids were opened on 922 tons of 2 to 10-in. steel pipe by Water District No. 2. Material is to be used in an extensive improvement program. Los Angeles Department of Water and Power will open bids May 3 on 967 tons of 8, 12, and 16-in. cast iron pipe called for in three units of a PWA project.

Columbia Steel Co. took 2072 tons of structural steel involved in a superstructure for the San Francisco-Oakland Bay bridge. The superstructure consists of railway facilities in the East Bay yard. Bethlehem Steel Co. was awarded 449 tons of reinforcing bars to be used in supply buildings for a Government air depot at Sacramento. Other than these, awards in all forms of steel were small. Aggregate structural awards were 2745 tons and total reinforcing lettings were 984 tons.

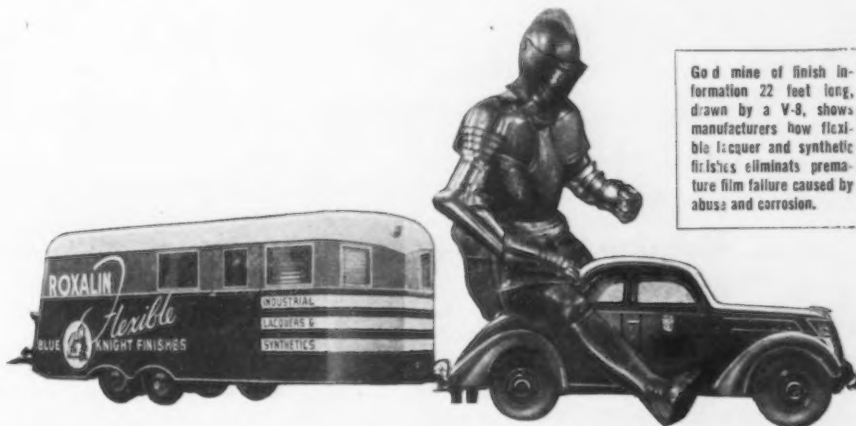
Construction work has slowed considerably on the Pacific Coast, particularly in the Northwest. Aggregate tonnages so far during 1937 are considerably below those of 1936 in all forms of steel in spite of heavy recent increases.

Armco to Spend Large Amount on Expansion

THE American Rolling Mill Co. will expend \$12,260,000 of the proceeds of a preferred stock issue for an expansion and improvement program. The stockholders have authorized the issuance of \$60,000,000 of preferred stock, of which \$45,000,000 cumulative preferred stock is to be used to retire outstanding indebtedness, increase pro-

duction facilities and enlarge working capital.

March shipments broke all company records, having exceeded shipments for any previous month by 15 per cent. The first quarter record of the company was marred by the Ohio River floods. Earnings for that period are estimated at about \$2,000,000, but would have been \$600,000 greater except for the flood. March earnings are estimated at about \$1,000,000. First quarter profit is equal to between 70c. and 75c. per share of stock outstanding.



Good mine of finish information 22 feet long, drawn by a V-8, shows manufacturers how flexible lacquer and synthetic finishes eliminates premature film failure caused by abuse and corrosion.

PIONEER (Since 1924) OF FLEXIBLE FINISHES FINDS NEW WAY TO DEMONSTRATE "FINISH - PERFORMANCE"

TRAIL-BLAZER

ROXALIN arranged an exhibit to show how permanent Flexibility and Adhesion (No Chipping—No Flaking—No Peeling) keep the film INTACT, seal out corrosion. Displays present more than 200 parts and assembled products showing Blue Knight Flexible Finishes (both lacquer and synthetic) applied on metals, wood, paper, leather, rubber, textiles and other base materials; demonstrating the way famous Blue Knight resistance characteristics preserve long finish life . . . the real foundation of customer good will.

Manufacturers on the route of the TRAIL-BLAZER will be advised of call dates well in advance. To make sure of a stop-over, please write Box 274, Roxalin Flexible Lacquer Company, Inc., Elizabeth, N. J.

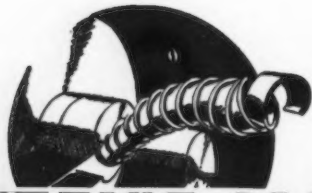


EXHIBIT OF ROXYN-C — THE NEW SYNTHETIC

ROXALIN Flexible FINISHES

CELLULOSE & SYNTHETIC TYPES
ENGINEERED FOR SPECIFIC PERFORMANCE

THE IRON AGE, April 22, 1937—97



THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... **Henry Ford buys \$5,000,000 turbo-generator by telephone.**

o o o

... **This may be followed by other purchases of equipment.**

o o o

... **Machine tool buying generally continues in good volume.**

Detroit

THE outstanding order of the week, and one not likely soon to be duplicated, is Mr. Ford's personally telephoned order for a \$5,000,000 General Electric turbo-generator. This is probably the first step in a very heavy buying program at Ford's fulfilling his promise that he will build more automobiles, employ more labor and "demonstrate some real competition in quantity production with new methods." In general, there have been few machinery orders placed in Detroit this week, although inquiries continue heavy. Special machinery builders are being cagey about taking orders where the time element is extended enough to give importance to rising costs of materials and labor. Recent increases in cast iron prices and a long-continued climb in the price of copper and other metals have already been felt. Possibly following the trend that has been indicated by Ford, other buyers are inquiring for a great deal of highly automatic machinery. This is taken by many to indicate a desire to replace labor wherever possible.

The V-16 Cadillac program is being pushed steadily and other accounts that have been active in recent weeks are continuing. In tool and die shops, the lack of programs for this year has been felt severely. One recently enlarged shop has installed some machinery for production of small parts on contract to help carry the overhead.

Cleveland

BUSINESS with most machine tool manufacturers is very good, although some prospective orders are not being placed because of extended deliveries. Sales by a local lathe manufacturer have increased 20 per cent this month over the same period in March, and its deliveries have been extended to October and November.

Sales by a manufacturer of automatic machines slightly exceed shipments. Orders and inquiries in this territory continue rather light. The New York Central Railroad has purchased a turret lathe for its Collinwood shops, Cleveland, and has two vertical boring mills pending. The Marion Steam Shovel Co., Marion, Ohio, is reported to be considering the purchase of a number of large tools.

Pittsburgh

ORDERS have picked up somewhat in the past week, the increase being of a general nature. Inquiries continue plentiful with no signs of any let-up. Most customers are attempting to catch up on their machine tool programs following the low period of activity during the depression. That the "catching up" period will take quite some little time is evidenced by the fact that there exists an acute shortage of skilled workmen at machine tool manufacturers' plants. In addition to this factor, most plants are working 40 to 48 hr. a week, whereas in 1929 the work week in most cases ran around 52 hr. For equipment on which extended deliveries exist, most makers are quoting on the basis of price at the time of shipment. Dealers continue to benefit indirectly as a result of exceptionally heavy backlogs at steel mill equipment manufacturers' plants. Of interest is the statement of Westinghouse Electric & Mfg. Co. that its unfilled orders on March 31 amounted to approximately \$74,000,000, the highest since 1923.

New York

MACHINE tool sellers report good business. First quarter sales in nearly all offices were more than double those of the same period last year, although shipments were about the

same because of delays caused by the floods in and around Cincinnati. One dealer states that already this year sales and unshipped orders on hand amount to more than his total sales in 1936. Deliveries are so extended, however, that it is believed in this particular instance not much more business can be accepted for shipment this year. Price advances are general and are ranging throughout the entire line of tools.

Chicago

NEW price advances continue to make their appearance. The April sales volume will be close to that of March, and the number of plans being discussed points to an excellent fall, and, as a whole, to a good year. Western railroads, with the exception of the Burlington, have about completed their purchases. Having bought heavily, the Santa Fe now finds it will need an extra cold saw and a lathe. Analysis of orders discloses that standard and special machine tools are being placed on about a fifty-fifty basis.

Cincinnati

THE machinery market continues active. Demand continues to include widely diversified users, and territory represented includes domestic and foreign points. Production is at a high rate, although lack of adequate skilled labor continues to cramp full shop operations. Flood troubles are almost erased, although the need for pattern replacements still exists. Pattern shops are also experiencing difficulty in obtaining their full needs of skilled men, causing a slower replacement of patterns than desired.

Machine Tool Orders Higher in March

THE National Machine Tool Builders' Association reports that March sales in dollar volume were higher than those of January and February and 85 per cent of the December total, which was the peak for machine tool sales in a good many years. Domestic orders were higher than in either of the two preceding months, while foreign orders, representing 18 per cent of the March total, were a little under those of February.

In dollar volume the foreign orders for the first quarter exceeded slightly the volume for the first quarter of 1936 and were equal to 37 per cent of the entire export business booked in the full year 1936.

The three-months moving index stood at 192.4 at the end of March compared with 207.7 at the end of February. These index figures are based on 1926 sales, for which the figure 100 is used.



...NON-FERROUS...

... *Pronounced weakness abroad affects metals here.*

o o o

... *Lead unchanged; tin off nearly 4 1/4c. at New York.*

NEW YORK, April 20.—Liquidation of speculative holdings in non-ferrous metals continued to undermine foreign markets last week. Both in London and on the continent reaction to the recent inflationary boom gathered headway. Prices developed further weakness, with losses

becoming more pronounced as the week unfolded. Domestic markets showed effects of this influence.

Copper

Producers reduced the price to domestic users 1c. today to 14.50c. a lb., delivered Connecticut Valley. Earlier during the week, mine pro-

ducers moved down from 16.00c. to the custom smelters' level of 15.50c. Today all interests moved down uniformly. The decrease is attributed directly to weakness in foreign copper. Export sales at present are being made as low as 14.00c., c.i.f., European ports. Demand both from foreign and domestic sources is inactive.

Lead

Buying of pig lead in the domestic market was more active than that affecting other metals last week, though more recently demand has tended to quiet down. Despite unsettlement abroad, prices here were easily maintained at 5.85c., St. Louis, and 6.00c. and 6.05c., New York. Further buying is anticipated in view of consumers being uncovered on approximately 40 per cent of their normal May requirements.

Zinc

At a late hour today the price of zinc in the domestic market appeared to be weakening on report of a sale of 150 tons at 6.75c., East St. Louis basis, against the published quotation of 7.00c. Producers announced no immediate action confirming the lower basis. As buying diminished during the week, sellers who had been asking 7.25c. for spot delivery moved down uniformly to the 7.00c. level.

Tin

Tin quotations came in for their share of weakness last week, and spot Straits at New York declined steadily to about 56.37 1/2c. a lb. around the noon hour today, compared with a price a week ago of 60.60c. Contrary to usual policy, buyers bought steadily as the market receded. Standard quotations in London this morning were £249 prompt and £245 10s. futures, while the price in the East was £255 10s.

The Week's Prices. Cents Per Pound for Early Delivery

| | Apr. 14 | Apr. 15 | Apr. 16 | Apr. 17 | Apr. 19 | Apr. 20 |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Electrolytic copper, Conn.* | 15.50 | 15.50 | 15.50 | 15.50 | 15.50 | 14.50 |
| Lake copper, N. Y..... | 15.62 1/2 | 15.62 1/2 | 15.62 1/2 | 15.62 1/2 | 15.62 1/2 | 14.62 1/2 |
| Straits tin, spot, New York | 60.87 1/2 | 59.75 | 58.50 | 57.37 1/2 | 56.37 1/2 | 55.37 1/2 |
| Zinc, East St. Louis..... | 7.00 | 7.00 | 7.00 | 7.00 | 7.00 | 7.00 |
| Zinc, New York..... | 7.35 | 7.35 | 7.35 | 7.35 | 7.35 | 7.35 |
| Lead, St. Louis..... | 5.85 | 5.85 | 5.85 | 5.85 | 5.85 | 5.85 |
| Lead, New York..... | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |

*Delivered Connecticut Valley; price 1/4c. lower delivered in New York.

†Noon Price.

Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb. delivered.

Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 17.00c. a lb., New York.

Quicksilver, \$91.00 to \$93.00 per flask of 76 lb.

Brass ingots, commercial 85-5-5-5, 15.25c. a lb. delivered; in Middle West 1/4c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse Delivered Prices, Base per Lb.

| | |
|---|--------------------|
| Tin, Straits pig..... | 57.50c. to 58.50c. |
| Tin, bar..... | 59.50c. to 60.50c. |
| Copper, Lake..... | 15.50c. to 16.50c. |
| Copper, electrolytic..... | 15.50c. to 16.50c. |
| Copper, castings..... | 15.50c. to 16.50c. |
| *Copper sheets, hot-rolled..... | 23.12 1/2c. |
| *High brass sheets..... | 20.62 1/2c. |
| *Seamless brass tubes..... | 23.37 1/2c. |
| *Seamless copper tubes..... | 23.87 1/2c. |
| *Brass rods..... | 17.00c. |
| Zinc, slabs..... | 8.25c. to 9.25c. |
| Zinc, sheets (No. 9), casks, 1200 lb. and over..... | 13.75c. |
| Lead, American pig..... | 7.00c. to 8.00c. |
| Lead, bar..... | 8.00c. to 9.00c. |
| Lead, sheets, cut..... | 10.50c. |
| Antimony, Asiatic..... | 18.00c. to 19.00c. |
| Alum., virgin, 99 per cent plus..... | 24.30c. |
| Alum., No. 1 for remelting, 98 to 99 per cent..... | 19.50c. to 21.00c. |
| Solder, 1/2 and 1/2..... | 36.50c. to 38.50c. |
| Babbitt metal, commercial grades..... | 25.00c. to 65.00c. |

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 3 1/2 per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse Delivered Prices per Lb.

| | |
|-----------------------|---------|
| Tin, Straits pig..... | 61.50c. |
|-----------------------|---------|

| | |
|----------------------------------|--------------------|
| Tin, bar..... | 63.50c. |
| Copper, Lake..... | 16.50c. to 16.75c. |
| Copper, electro-lytic..... | 16.50c. to 16.75c. |
| Copper, castings..... | 16.25c. to 16.50c. |
| Zinc, slabs..... | 8.75c. to 9.00c. |
| Lead, American pig..... | 6.50c. to 6.75c. |
| Lead, bar..... | 10.00c. |
| Antimony, Asiatic..... | 18.75c. |
| Babbitt metal, medium grade..... | 23.50c. |
| Babbitt metal, high grade..... | 65.50c. |
| Solder, 1/2 and 1/2..... | 38.25c. |

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

| | Dealers' Buying Prices | Dealers' Selling Prices |
|--|------------------------|-------------------------|
| Copper, hvy. crucible..... | 12.00c. | 12.75c. |
| Copper, hvy. and wire..... | 11.37 1/2c. | 11.87 1/2c. |
| Copper, light and bottoms..... | 10.37 1/2c. | 10.62 1/2c. |
| Brass, heavy..... | 7.00c. | 7.62 1/2c. |
| Brass, light..... | 5.75c. | 6.50c. |
| Hvy. machine composition..... | 10.12 1/2c. | 10.62 1/2c. |
| No. 1 yel. brass turnings..... | 7.37 1/2c. | 7.87 1/2c. |
| No. 1 red brass or compos. turnings..... | 9.75c. | 10.25c. |
| Lead, heavy..... | 4.75c. | 5.12 1/2c. |
| Cast aluminum..... | 12.12 1/2c. | 13.25c. |
| Sheet aluminum..... | 13.25c. | 14.75c. |
| Zinc..... | 3.75c. | 4.12 1/2c. |

Welsh Tin Plate Makers Merge

LONDON (Special Correspondence). A merger has been announced between two important Welsh tin plate concerns, the Old Castle Tin Plate Co., and the Western Tin Plate Co., both of which own works at Llanelli.

The Old Castle is the largest works in the Welsh tin plate trade and has 17 mills, while the Western works have been recently modernized by the introduction of American plant and methods. The Welsh tin plate trade is now practically controlled by three groups.



IRON AND STEEL SCRAP

... Composite down to \$20.75 from \$21.42 a week ago.

o o o

... All markets still weak as mills refrain from buying.

APRIL 20. — With mills fairly well stocked with supplies and not prone to meet brokers' price demands, the markets all over the country continue to display an uneasy undertone. There have been moderate declines, mostly of a sympathetic nature, at Pittsburgh, Chicago and in eastern Pennsylvania, and the composite figure has reflected this movement by dropping from the \$21.42 figure of a week ago to \$20.75. In view of the continued high rate of steel-making operations, most sellers believe that current declines will shortly be followed by recovery. However, many mills either do not share this belief, or at least do not think the bottom has been reached, for there has been little buying interest as prices move downward.

A cartel headed by Great Britain and including most of the major steel-producing countries except Japan has purchased 350,000 tons of steel scrap from a group of five American scrap brokers who have been prominent in the export trade. The prices paid were \$22.65 per ton, f. a. s. Atlantic ports, for No. 1 heavy melting steel and \$21.65 for No. 2 heavy melting steel. Great Britain will make allotments to other countries that are participating in this purchase. It is said that this purchase was made in anticipation of the possibility of the adoption by Congress of a law to license scrap exports. Meanwhile, Japanese interests are trying to buy a large tonnage and are said to be willing to pay up to \$24, Atlantic ports, which with freight rates averaging about \$11 a ton would cost \$35 delivered in Japan.

Pittsburgh

The continued absence of buyers from the market has caused further softness. Shortages in the market are negligible, and about the only transactions being closed are between brokers and dealers. Some brokers have picked up small lots of No. 1 steel at as low as \$21.50. While no drastic weakness is apparent at this time, No. 1 heavy melt-

ing is off 50c., making it quotable at \$22 to \$22.50. Corresponding grades are also down with No. 2 heavy melting showing pronounced weakness.

Chicago

Brokers are beginning to see the bottom of the price slide though it is probable, as indicated by prices being paid to dealers and the railroads, that a drop of another 50c. or so a ton can be expected. There continues to be a large influx of scrap, but only a small part is of the kind and grade that mills eagerly seek. Here and there is found a producer who has given up dumping and is starting to accumulate for higher prices. A cargo of blast furnace scrap is leaving Chicago this week for Lake Erie. A factor which may have a direct bearing on prices is the threat of a strike at the ore docks.

Cleveland

The market is weak and in a very unsettled state in regard to prices. However, basing quotations on sentiment rather than on actual sales, prices appear to be 50c. a ton lower on both steel-making and blast furnace grades. Scrap is being offered very freely, but consumers are showing no interest. What is apparently a contributing factor to the weakness is a large amount of scrap that is now being moved on the Great Lakes. Several cargoes reached Cleveland during the week from Detroit, Toronto and other Lake ports.

Philadelphia

For the first time since Nov. 10 there has been a decline in prices in this market, No. 1 and No. 2 steel being marked down \$1 a ton, with 50c. decreases prominent throughout the list. While definite assurance of sales at lower levels is lacking, it is certain that brokers' offering prices are materially reduced, with \$19 being paid for export shipments. It is understood that little is being bought for foreign countries at present, although five brokers have undertaken to supply around 300,000 tons of scrap to a cartel abroad over the next four months.

Buffalo

The principal consumers are out of the market, and the price list again has sagged. Though it is true that no transactions have taken place, it is

manifest that No. 1 heavy melting steel could be purchased for around \$19 to \$19.50. Dealers who are not anxious to get scrap are offering far below this figure.

Boston

Brokers dealing with Pennsylvania steel mills are having their own sit-down strike. Mills having intimated they are out of the scrap market at prevailing prices, brokers are letting things take their own way, and have withdrawn all prices for material to be shipped into that State. Exporters, on the other hand, are busy. Two steamers are loading here now, and exporters say foreign demand for scrap is unabated. No. 1 steel for export is still \$17.50 a ton, delivered at local dock, and No. 2 is \$16.50. No. 2 cast is selling at around \$15 a ton, and a cargo of mill cinder material has just sold for \$7.75 a ton, delivered local dock.

New York

A group of five dealers in this country has arranged to supply approximately 300,000 tons to European interests over the next four months. Purchase of this amount was made through a central buying agency set-up, with headquarters in London, by a cartel of European steel producers. The bulk of the order is for heavy melting steel. New York dealers, currently shipping against foreign orders, are paying \$1 a ton less for heavy melting steel trucked to the docks, and 50c. less on No. 2 cast and stove plate. The principal steel mill grades on cars are 50c. lower. Dealers have curtailed their buying of scrap over the past week or two, but are expected to become active again shortly. The market's softer tone is not causing much concern.

Detroit

Despite continued dropping of prices locally, there has been no support offered by mills at the current levels, thus indicating that lower quotations may be expected rather than a leveling off. It was generally accepted that Chrysler's list closed at prices favorable to the buyers of the last list but had failed to get delivery because of the strike. In the closing of Fisher Body Co.'s list last week, there were reports that bundles brought a price above the market, but the disposition of the list was not revealed officially.

Cincinnati

Rejections of old materials in other areas and mill tendency to resist further buying have weakened the scrap market the past week. Bids are down 50c. Supplies are abundant, and some dealers are refusing to stock additional supplies. Dealers view the situation as temporary and expect strengthening this week.

St. Louis

Scrap iron prices in this market are unchanged, but nominally so, as there has been no trading for several weeks. While the consumers in the district are operating at a high rate, they are not buying any scrap iron because their yards are already congested with material. The tone of the market is soft.

Iron and Steel Scrap Prices

PITTSBURGH

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. mltng. steel. | \$22.00 to \$22.50 |
| Railroad hvy. mltng. | 22.00 to 23.50 |
| No. 2 hvy. mltng. steel. | 17.50 to 18.00 |
| No. 2 RR wrought | 22.00 to 22.50 |
| Scrap rails | 23.00 to 23.50 |
| Rails 3 ft. and under. | 26.50 to 27.00 |
| Comp. sheet steel | 22.00 to 22.50 |
| Hand bundled sheets. | 19.50 to 20.00 |
| Hvy. steel axle turn. | 20.50 to 21.00 |
| Machine shop turn. | 14.00 to 14.50 |
| Short shov. turn. | 15.00 to 15.50 |
| Mixed bor. & turn. | 14.00 to 14.50 |
| Cast iron borings | 14.00 to 14.50 |
| Cast iron carwheels | 19.50 to 20.00 |
| Hvy. breakable cast. | 16.00 to 16.50 |
| No. 1 cast | 20.00 to 20.50 |
| RR. knuckles & cplrs. | 27.50 to 28.00 |
| Rail coil & leaf springs | 27.50 to 28.00 |
| Rolled steel wheels. | 27.50 to 28.00 |
| Low phos. billet crops. | 28.00 to 28.50 |
| Low phos. sh. bar | 27.00 to 27.50 |
| Low phos. punchings. | 25.00 to 25.50 |
| Low phos. plate, hvy. | 26.50 to 27.00 |
| Low phos. plate clip. | 25.00 to 25.50 |
| Steel car axles | 26.00 to 26.50 |

CLEVELAND

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. mltng. steel. | \$19.50 to \$20.00 |
| No. 2 hvy. mltng. steel. | 18.00 to 18.50 |
| Comp. sheet steel | 18.50 to 19.00 |
| Light bund. stampings. | 14.50 to 15.00 |
| Drop forge flashings. | 18.00 to 18.50 |
| Machine shop turn. | 13.00 to 13.50 |
| Short shov. turn. | 14.00 to 14.50 |
| No. 1 busheling | 18.50 to 19.00 |
| Steel axle turnings. | 16.00 to 16.50 |
| Low phos. billet and bloom crops | 26.00 to 26.25 |
| Cast iron borings | 14.00 to 14.50 |
| Mixed bor. & turn. | 14.00 to 14.50 |
| No. 2 busheling | 14.50 to 15.00 |
| No. 1 cast | 20.50 to 21.00 |
| Railroad grate bars. | 12.00 to 12.50 |
| Stove plate | 16.00 to 16.50 |
| Rails under 3 ft. | 25.00 to 25.50 |
| Rails for rolling | 21.50 to 22.00 |
| Railroad malleable | 21.00 to 21.50 |
| Cast iron carwheels. | 22.00 to 22.50 |

PHILADELPHIA

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. mltng. steel. | \$19.50 to \$20.00 |
| No. 2 hvy. mltng. steel. | 18.50 to 19.00 |
| Hydraulic bund., new. | 19.50 to 20.00 |
| Hydraulic bund., old. | 16.50 to 17.00 |
| Steel rails for rolling. | 21.50 to 22.00 |
| Cast iron carwheels | 21.00 to 21.50 |
| Hvy. breakable cast | 19.50 to 20.00 |
| No. 1 cast | 22.00 to 22.50 |
| Stove plate (steel wks.) | 16.50 to 17.00 |
| Railroad malleable | 19.00 to 19.50 |
| Machine shop turn. | 14.00 to 14.50 |
| No. 1 blast furnace | 13.00 to 13.50 |
| Cast borings | 13.00 to 13.50 |
| Heavy axle turnings. | 17.50 to 18.00 |
| No. 1 low phos. hvy. | 25.00 to 25.50 |
| Couplers & knuckles. | 25.00 to 25.50 |
| Rolled steel wheels | 25.00 to 25.50 |
| Steel axles | 25.50 to 26.00 |
| Shafting | 25.00 to 26.00 |
| No. 1 RR. wrought | 19.50 to 20.00 |
| Spec. iron & steel pipe | 17.00 to 17.50 |
| No. 1 forge fire | 17.00 to 17.50 |
| Cast borings (chem.) | 13.50 to 14.00 |

CHICAGO

| Delivered to Chicago district consumers: | |
|--|--------------------|
| Per Gross Ton | |
| Hvy. mltng. steel | \$20.00 to \$20.50 |
| Auto. hvy. mltng. steel | 18.00 to 18.50 |
| Alloy free | 17.50 to 18.00 |
| Shovelling steel | 20.00 to 20.50 |
| Hydraul. comp. sheets. | 19.00 to 19.50 |
| Drop forge flashings. | 16.50 to 17.00 |
| No. 1 busheling | 18.50 to 19.00 |
| Rolled carwheels | 22.00 to 23.50 |
| Railroad tires, cut | 23.50 to 24.00 |
| Railroad leaf springs. | 23.00 to 23.50 |
| Steel coup. & knuckles | 22.50 to 23.00 |
| Axle turnings | 18.50 to 19.00 |
| Coil springs | 23.75 to 24.25 |
| Axle turn. (elec.) | 20.50 to 21.00 |
| Low phos. punchings. | 23.00 to 23.50 |
| Low phos. plates, 12 in. and under | 23.00 to 23.50 |
| Cast iron borings | 12.25 to 12.75 |
| Short shov. turnings. | 12.25 to 12.75 |
| Machine shop turn. | 11.50 to 12.00 |
| Rerolling rails | 23.00 to 23.50 |
| Steel rails under 3 ft. | 22.50 to 23.00 |
| Steel rails under 2 ft. | 24.00 to 24.50 |
| Angle bars, steel | 22.50 to 23.00 |
| Cast iron carwheels | 21.50 to 22.00 |
| Railroad malleable | 21.25 to 21.75 |
| Agric. malleable | 18.25 to 18.75 |
| Iron car axles | 26.50 to 27.00 |

Per Net Ton

| | |
|-----------------------|--------------------|
| Steel car axles | \$24.00 to \$24.50 |
| No. 1 RR. wrought. | 17.75 to 18.25 |
| No. 2 RR. wrought. | 17.75 to 18.25 |
| No. 2 busheling, old. | 8.50 to 9.00 |
| Locomotive tires | 19.00 to 19.50 |
| Pipes and flues | 14.00 to 14.50 |
| No. 1 machinery cast. | 16.50 to 17.00 |
| Clean auto. cast. | 15.50 to 16.00 |
| No. 1 railroad cast | 15.25 to 15.75 |
| No. 1 agric. cast. | 13.50 to 14.00 |
| Stove plate | 12.00 to 12.50 |
| Grate bars | 13.50 to 14.00 |
| Brake shoes | 13.50 to 14.00 |

BUFFALO

| Per gross ton, f.o.b. consumers' plants: | |
|--|--------------------|
| No. 1 hvy. mltng. steel. | \$19.00 to \$19.50 |
| No. 2 hvy. mltng. steel. | 17.50 to 18.00 |
| Scrap rails | 19.00 to 19.50 |
| New hvy. b'ndled sheet | 17.50 to 18.00 |
| Old hydraul. bundles | 16.50 to 17.00 |
| Drop forge flashings | 17.50 to 18.00 |
| No. 1 busheling | 17.50 to 18.00 |
| Hvy. axle turnings. | 13.50 to 14.00 |
| Machine shop turn. | 13.00 to 13.50 |
| Knuckles & couplers. | 21.00 to 21.50 |
| Coil & leaf springs. | 21.00 to 21.50 |
| Rolled steel wheels. | 21.00 to 21.50 |
| Low phos. b'let crops. | 21.50 to 22.00 |
| Shov. turnings | 13.50 to 14.00 |
| Mixed bor. & turn. | 11.50 to 12.00 |
| Cast iron borings | 11.50 to 12.00 |
| Steel car axles | 20.00 to 20.50 |
| No. 1 machinery cast. | 18.00 to 18.50 |
| No. 1 cupola cast. | 17.00 to 17.50 |
| Stove plate | 14.00 to 14.50 |
| Steel rails under 3 ft. | 21.50 to 22.00 |
| Cast iron carwheels. | 17.00 to 17.50 |
| Railroad malleable | 19.50 to 20.00 |
| Chemical borings | 12.00 to 12.50 |

BIRMINGHAM

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| Hvy. melting steel | \$15.00 to \$18.00 |
| Scrap steel rails | 17.00 to 19.00 |
| Short shov. turnings. | 9.00 to 10.00 |
| Stove plate | 9.00 to 10.50 |
| Steel axles | 18.00 to 19.00 |
| Iron axles | 16.50 to 18.00 |
| No. 1 RR. wrought. | 13.00 to 15.00 |
| Rails for rolling | 18.00 to 20.00 |
| No. 1 cast | 16.00 to 18.00 |
| Tramcar wheels | 16.00 to 17.00 |

ST. LOUIS

| Dealer's buying prices per gross ton delivered to consumer: | |
|---|--------------------|
| Selected hvy. steel. | \$18.50 to \$19.00 |
| No. 1 hvy. melting. | 18.00 to 18.50 |
| No. 2 hvy. melting. | 16.00 to 16.50 |
| No. 1 locomotive tires. | 20.00 to 20.50 |
| Misc. stand.-sec. rails. | 19.00 to 19.50 |
| Railroad springs | 21.50 to 22.00 |
| Bundled sheets | 11.00 to 11.50 |
| No. 2 RR. wrought | 18.00 to 18.50 |
| No. 1 busheling | 14.00 to 14.50 |
| Cast bor. & turn. | 7.50 to 8.00 |
| Rails for rolling | 20.00 to 20.50 |
| Machine shop turn. | 9.00 to 9.50 |
| Heavy turnings | 14.00 to 14.50 |
| Steel car axles | 21.50 to 22.00 |
| Iron car axles | 22.00 to 22.25 |
| No. 1 RR. wrought | 15.50 to 16.00 |
| Steel rails under 3 ft. | 20.00 to 20.50 |
| Steel angle bars | 19.25 to 19.75 |
| Cast iron carwheels. | 19.00 to 19.50 |
| No. 1 machinery cast. | 15.00 to 15.50 |
| Railroad malleable | 19.50 to 20.00 |
| No. 1 railroad cast | 15.00 to 15.50 |
| Stove plate | 12.50 to 13.00 |
| Agricul. malleable | 12.50 to 13.00 |
| Grate bars | 12.00 to 12.50 |
| Brake shoes | 13.50 to 14.00 |

CINCINNATI

| Dealers' buying prices per gross ton: | |
|---------------------------------------|--------------------|
| No. 1 hvy. mltng. steel. | \$17.75 to \$18.25 |
| No. 2 hvy. mltng. steel. | 15.75 to 16.25 |
| Scrap rails for mltng. | 21.00 to 21.50 |
| Loose sheet cl'ppings. | 13.50 to 14.00 |
| Bundled sheets | 15.50 to 16.00 |
| Cast iron borings | 11.00 to 11.50 |
| Machine shop turn. | 11.75 to 12.25 |
| No. 1 busheling | 15.00 to 15.50 |
| No. 2 busheling | 9.50 to 10.00 |
| Rails for rolling | 22.50 to 23.00 |
| No. 1 locomotive tires. | 17.00 to 17.50 |
| Short tails | 23.00 to 23.50 |
| Cast iron carwheels. | 17.50 to 18.00 |
| No. 1 mach'ery cast. | 17.00 to 17.50 |
| No. 1 railroad cast. | 16.00 to 16.50 |
| Burnt cast | 11.50 to 12.00 |
| Stove plate | 11.50 to 12.00 |
| Agricult. malleable | 17.00 to 17.50 |
| Railroad malleable | 18.50 to 19.00 |

DETROIT

| Dealers' buying prices per gross ton: | |
|---------------------------------------|--------------------|
| No. 1 hvy. mltng. steel. | \$16.50 to \$17.00 |
| No. 2 hvy. mltng. steel. | 15.50 to 16.00 |
| Borings and turnings. | 12.00 to 12.50 |
| Long turnings | 12.00 to 12.50 |
| Short shov. turnings. | 13.00 to 13.50 |
| No. 1 machinery cast. | 16.75 to 17.25 |
| Automotive cast. | 17.00 to 17.50 |
| Hydraul. comp. sheets. | 18.50 to 19.00 |
| Stove plate | 11.00 to 11.50 |
| New factory bushel. | 16.25 to 16.75 |
| Old No. 2 busheling. | 11.50 to 12.00 |
| No. 2 busheling (black fender stock) | 12.50 to 13.00 |
| Sheet clippings | 13.00 to 13.50 |
| Flashings | 13.50 to 16.00 |
| Low phos. plate scrap. | 17.50 to 18.00 |

YOUNGSTOWN

| Per gross ton delivered to consumer: | |
|--------------------------------------|--------------------|
| No. 1 hvy. mltng. steel. | \$21.00 to \$21.50 |
| Hydraulic bundles | 20.50 to 21.00 |
| Machine shop turn | 15.00 to 15.50 |

NEW YORK

| Dealers' buying prices per gross ton: | |
|---|--------------------|
| No. 1 hvy. mltng. steel. | \$16.50 to \$17.00 |
| No. 2 hvy. mltng. steel. | 15.00 to 15.50 |
| Hvy. breakable cast. | 15.00 to 15.50 |
| No. 1 machinery cast. | 16.25 to 16.75 |
| No. 2 cast | 15.00 to 15.50 |
| Stove plate | 12.50 to 13.00 |
| Steel car axles. | 25.00 to 26.00 |
| Shafting | 20.00 to 20.50 |
| No. 1 RR. wrought. | 17.50 to 18.00 |
| No. 1 wrought long. | 16.50 to 17.00 |
| Spec. iron & steel pipe | 14.50 to 15.00 |
| Rails for rolling. | 18.50 to 19.00 |
| Clean steel turnings | 9.00 to 9.50 |
| Cast borings | 9.50 to 10.00 |
| No. 1 blast furnace | 9.50 to 10.00 |
| Cast borings (chem.) | 12.00 to 12.50 |
| Unprepar. yard scrap. | 10.50 to 11.00 |
| Per gross ton delivered to foundries: | |
| No. 1 machn. cast. | \$18.00 to \$18.50 |
| No. 1 hvy. cast cupola. | 15.50 to 16.00 |
| No. 2 cast | 14.50 to 15.00 |
| Add 50c. to 75c. to above quotations to secure North Jersey prices. | |

BOSTON

| Dealers' buying prices per gross ton: | |
|---|--------------------|
| No. 1 hvy. mltng. steel. | \$16.30 to \$16.80 |
| Scrap rails | 16.30 to 16.80 |
| No. 2 steel. | 15.25 to 15.75 |
| Breakable cast. | 14.50 to 15.50 |
| Machine shop turn. | 9.50 to 9.85 |
| Mixed bor. & turn. | 7.80 to 9.20 |
| Bund. skeleton long. | 13.50 to 13.75 |
| Shafting | 19.00 to 19.50 |
| Cast bor. chemical. | 9.50 to 10.25 |
| Per gross ton delivered consumers' yards: | |
| Textile cast | \$17.00 to \$19.00 |
| No. 1 machine cast. | 17.00 to 19.00 |
| Stove plate | 10.00 to 10.50 |

CANADA

| Dealers' buying prices at their yards, per gross ton | |
|--|-----------------|
| Toronto Montreal | |
| No. 1 hvy. mltng. stl. | \$13.50 \$13.00 |
| No. 2 hvy. mltng. stl. | 12.50 12.00 |
| Mixed dealers steel. | 12.00 11.75 |
| Scrap pipe | 10.25 9.75 |
| Steel turnings | 9.00 8.50 |
| Cast borings | 9.75 9.50 |
| Machinery cast | 17.50 17.00 |
| Dealers cast | 15.50 15.00 |
| Stove plate | 13.00 12.75 |

EXPORT

| Dealers' buying prices per gross ton: | |
|---|--------------------|
| New York, truck lots, delivered, barges. | |
| No. 1 hvy. mltng. steel. | \$17.00 |
| No. 2 hvy. mltng. steel. | 16.00 |
| No. 2 cast. | 15.00 |
| Stove plate | \$12.00 to \$12.50 |
| Boston on cars at Arms Base or Mystic Wharf | |
| No. 1 hvy. mltng. steel. | \$17.50 |
| No. 2 hvy. mltng. steel. | 16.50 |
| Rails (scrap) | 17.50 |
| Stove plate | 14.50 |
| No. 2 cast | \$14.75 to 15.00 |
| Philadelphia, delivered alongside boats. | |
| Port Richmond | |
| No. 1 hvy. mltng. steel. | \$19.00 |
| No. 2 hvy. mltng. steel. | 18.00 |
| New Orleans, f.o.b., Stuyvesant Dock | |
| No. 1 hvy. mltng. steel. | \$17.50 |
| No. 2 hvy. mltng. steel. | 16.50 |
| Los Angeles, on cars or trucks at local piers | |
| No. 1 hvy. mltng. steel. | \$10.50 to \$11.00 |
| Compressed bundles | 8.50 to 9.00 |

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton
Rerolling \$37.00
Forging quality 43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open-hearth or Bessemer \$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 2.10c.

Wire Rods (No. 5 to 9/32 in.)

Per Gross Ton
F.o.b. Pittsburgh or Cleveland \$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 48.00
F.o.b. Worcester, Mass. 49.00
F.o.b. Birmingham 50.00
F.o.b. San Francisco 56.00
F.o.b. Galveston 53.00
Rods over 9/32 in. to 47/64 in., inclusive, \$5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
F.o.b. Pittsburgh 2.45c.
F.o.b. Chicago or Gary 2.50c.
F.o.b. Duluth 2.60c.
Del'd Detroit 2.60c.
F.o.b. Cleveland 2.50c.
F.o.b. Buffalo 2.55c.
Del'd Philadelphia 2.74c.
Del'd New York 2.78c.
F.o.b. Birmingham 2.60c.
F.o.b. cars dock Gulf ports... 2.85c.
F.o.b. cars dock Pacific ports... 3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 2.35c.
F.o.b. Buffalo 2.40c.
F.o.b. Birmingham 2.45c.
F.o.b. cars dock Gulf ports... 2.70c.
F.o.b. cars dock Pacific ports... 2.85c.

Billet Steel Reinforcing (Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.60c.
Del'd Detroit 2.70c.
F.o.b. cars dock Gulf ports... 2.95c.
F.o.b. cars dock Pacific ports... 2.95c.

Rail Steel Reinforcing (Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.45c.
F.o.b. cars dock Gulf ports... 2.80c.
F.o.b. cars dock Pacific ports... 2.80c.

Iron

F.o.b. Chicago 2.40c.
F.o.b. Pittsburgh (refined) 3.60c.

Cold Finished Bars and Shafting*

Base per Lb.
F.o.b. Pittsburgh 2.90c.
F.o.b. Cleveland, Chicago and Gary 2.95c.
F.o.b. Buffalo 3.00c.
F.o.b. Detroit 2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Gary 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Coatesville or Spar. Pt. 2.35c.
Del'd Philadelphia 2.435c.
Del'd New York 2.53c.
F.o.b. Birmingham 2.40c.

F.o.b. cars dock Gulf ports... 2.65c.
F.o.b. cars dock Pacific ports... 2.80c.
Wrought iron plates, f.o.b. Pittsburgh 3.80c.

Floor Plates

F.o.b. Pittsburgh 3.80c.
F.o.b. Chicago 3.85c.
F.o.b. Coatesville 3.90c.
F.o.b. cars dock Gulf ports... 4.20c.
F.o.b. cars dock Pacific ports... 4.35c.

Structural Shapes

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Buffalo or Bethlehem... 2.35c.
Del'd Philadelphia 2.455c.
Del'd New York 2.5025c.
F.o.b. Birmingham (standard) 2.40c.
F.o.b. cars dock Gulf ports... 2.65c.
F.o.b. cars dock Pacific ports... 2.80c.

Steel Sheet Piling

Base per Lb.
F.o.b. Pittsburgh 2.60c.
F.o.b. Chicago or Buffalo 2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton \$42.50
Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton \$43.00
Light rails (from rail steel) per gross ton 42.00

Base per Lb.

Spikes 3.15c.
Tie plates, steel 2.30c.
Tie plates, Pacific Coast ports... 2.40c.
Track bolts, to steam railroads. 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts) 65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE,

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
No. 10, f.o.b. Pittsburgh 2.40c.
No. 10, f.o.b. Gary 2.50c.
No. 10, del'd Detroit 2.60c.
No. 10, del'd Philadelphia 2.69c.
No. 10, f.o.b. Granite City 2.60c.
No. 10, f.o.b. Birmingham 2.55c.
No. 10, f.o.b. cars dock Pacific ports 2.95c.
No. 10 wrought iron, Pgh. 4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 3.15c.
No. 24, f.o.b. Gary 3.25c.
No. 24, del'd Detroit 3.35c.
No. 24, del'd Philadelphia 3.44c.
No. 24, f.o.b. Granite City 3.35c.
No. 24, f.o.b. Birmingham 3.30c.
No. 24, f.o.b. cars dock Pacific ports 3.80c.
No. 24 wrought iron, Pittsburgh 5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh... 3.10c.
No. 10 gage, f.o.b. Gary 3.20c.
No. 10 gage, f.o.b. Detroit 3.30c.
No. 10 gage, del'd Philadelphia... 3.39c.
No. 10 gage, f.o.b. Granite City... 3.30c.
No. 10 gage, f.o.b. Birmingham... 3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports 3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh... 3.55c.
No. 20 gage, f.o.b. Gary 3.65c.
No. 20 gage, del'd Detroit 3.75c.
No. 20 gage, del'd Philadelphia... 3.84c.
No. 20, f.o.b. Granite City 3.75c.
No. 20 gage, f.o.b. Birmingham... 3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports 4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh... 3.80c.
No. 24, f.o.b. Gary 3.90c.
No. 24, del'd Philadelphia 4.09c.
No. 24, f.o.b. Granite City 4.00c.

No. 24, f.o.b. Birmingham 3.95c.
No. 24, f.o.b. cars, dock, Pacific ports 4.40c.
No. 24, wrought iron, Pittsburgh 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.35c.
Armature 3.70c.
Electrical 4.20c.
Special Motor 5.10c.
Special Dynamo 5.80c.
Transformer 6.30c.
Transformer Special 7.30c.
Transformer Extra Special 7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.
Silicon Strip in coils—Sheet price plus \$44.00 sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh 4.10c.
F.o.b. Gary 4.20c.
F.o.b. cars, dock, Pacific ports 4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh 3.50c.
No. 20, f.o.b. Gary 3.60c.
No. 20, f.o.b. Granite City 3.70c.
No. 20, f.o.b. cars dock Pacific ports 4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb. 3.30c.
No. 28, Gary 3.40c.
No. 28, f.o.b. Granite City 3.50c.
No. 28, cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pittsburgh district mill \$5.35
Standard cokes, f.o.b. Gary 5.45
Standard coke, f.o.b. Granite City 5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Per Base Box

F.o.b. Pittsburgh \$4.65
F.o.b. Gary 4.75
F.o.b. Granite City 4.85

* Customary 7 1/2 per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C. \$11.00
15-lb. coating I.C. 13.00
20-lb. coating I.C. 14.00
25-lb. coating I.C. 15.00
30-lb. coating I.C. 16.25
40-lb. coating I.C. 18.50

Hot-Rolled Hoops, Bands, Strip and Flats under 1/4 in.

Base per Lb.

All widths up to 24 in., Pittsburgh 2.40c.
All widths up to 24 in., Chicago 2.50c.
All widths up to 24 in., del'd Detroit 2.60c.
All widths up to 24 in., Granite City 2.60c.
All widths up to 24 in., Birmingham 2.55c.
Cooperage stock, Pittsburgh... 2.50c.
Cooperage stock, Chicago 2.60c.

Cold-Rolled Strip*

Base per Lb.

F.o.b. Pittsburgh 3.20c.
F.o.b. Cleveland 3.20c.
Del'd Chicago 3.48c.
F.o.b. Worcester 3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

Pittsburgh and Cleveland Worcester

Carbon 0.25-0.50% 3.20c. 3.40c.
Carbon .51-.75 4.45c. 4.65c.
Carbon .76-1.00 6.30c. 6.50c.
Carbon Over 1.00 8.50c. 8.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland 3.45c.
No. 20, Pittsburgh or Cleveland 3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

Bright wire 2.90c.
Spring wire 3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

Standard wire nails \$2.75
Smooth coated nails \$2.75
Cut nails, carloads \$3.60

Base per 100 Lb.

Annealed fence wire \$3.20
Galvanized fence wire 3.60
Polished staples 3.45
Galvanized staples 3.70
Barbed wire, galvanized 3.40
Twisted barless wire 3.40
Woven wire fence, base column. 74
Single loop bale ties, base col... 63

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are 3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

| In. | Steel Black Galv. | In. | Wrought Iron Black Galv. |
|-------|-------------------|-------|--------------------------|
| 1/4 | 52 31 | 1/4 | 27 10 1/2 |
| 1/2 | 55 38 1/2 | 1/2 | 27 10 1/2 |
| 3/4 | 59 49 | 3/4 | 32 16 |
| 1 | 62 53 | 1 | 35 21 |
| 1 1/4 | 64 55 | 1 1/4 | 39 23 1/2 |
| | | 2 | 33 23 |

Lap Weld

| In. | Steel Black Galv. | In. | Wrought Iron Black Galv. |
|--------|-------------------|--------|--------------------------|
| 2 | 57 47 1/2 | 2 | 32 18 |
| 2 1/2 | 60 50 1/2 | 2 1/2 | 33 20 1/2 |
| 3 | 62 52 1/2 | 3 | 35 24 |
| 3 1/2 | 66 56 1/2 | 3 1/2 | 38 28 1/2 |
| 4 | 68 58 1/2 | 4 | 40 32 1/2 |
| 4 1/2 | 70 60 1/2 | 4 1/2 | 42 36 1/2 |
| 5 | 72 62 1/2 | 5 | 44 40 1/2 |
| 5 1/2 | 74 64 1/2 | 5 1/2 | 46 44 1/2 |
| 6 | 76 66 1/2 | 6 | 48 48 1/2 |
| 6 1/2 | 78 68 1/2 | 6 1/2 | 50 52 1/2 |
| 7 | 80 70 1/2 | 7 | 52 56 1/2 |
| 7 1/2 | 82 72 1/2 | 7 1/2 | 54 60 1/2 |
| 8 | 84 74 1/2 | 8 | 56 64 1/2 |
| 8 1/2 | 86 76 1/2 | 8 1/2 | 58 68 1/2 |
| 9 | 88 78 1/2 | 9 | 60 72 1/2 |
| 9 1/2 | 90 80 1/2 | 9 1/2 | 62 76 1/2 |
| 10 | 92 82 1/2 | 10 | 64 80 1/2 |
| 10 1/2 | 94 84 1/2 | 10 1/2 | 66 84 1/2 |
| 11 | 96 86 1/2 | 11 | 68 88 1/2 |
| 11 1/2 | 98 88 1/2 | 11 1/2 | 70 92 1/2 |
| 12 | 100 90 1/2 | 12 | 72 96 1/2 |

Butt Weld, extra strong, plain ends

| In. | Steel Black Galv. | In. | Wrought Iron Black Galv. |
|--------|-------------------|--------|--------------------------|
| 1/4 | 50 36 1/2 | 1/4 | 27 10 1/2 |
| 1/2 | 52 38 1/2 | 1/2 | 27 10 1/2 |
| 3/4 | 54 40 1/2 | 3/4 | 32 16 |
| 1 | 56 42 1/2 | 1 | 35 21 |
| 1 1/4 | 58 44 1/2 | 1 1/4 | 39 23 1/2 |
| 1 1/2 | 60 46 1/2 | 1 1/2 | 42 28 1/2 |
| 1 3/4 | 62 48 1/2 | 1 3/4 | 44 32 1/2 |
| 2 | 64 50 1/2 | 2 | 46 36 1/2 |
| 2 1/4 | 66 52 1/2 | 2 1/4 | 48 40 1/2 |
| 2 1/2 | 68 54 1/2 | 2 1/2 | 50 44 1/2 |
| 2 3/4 | 70 56 1/2 | 2 3/4 | 52 48 1/2 |
| 3 | 72 58 1/2 | 3 | 54 52 1/2 |
| 3 1/4 | 74 60 1/2 | 3 1/4 | 56 56 1/2 |
| 3 1/2 | 76 62 1/2 | 3 1/2 | 58 60 1/2 |
| 3 3/4 | 78 64 1/2 | 3 3/4 | 60 64 1/2 |
| 4 | 80 66 1/2 | 4 | 62 68 1/2 |
| 4 1/4 | 82 68 1/2 | 4 1/4 | 64 72 1/2 |
| 4 1/2 | 84 70 1/2 | 4 1/2 | 66 76 1/2 |
| 4 3/4 | 86 72 1/2 | 4 3/4 | 68 80 1/2 |
| 5 | 88 74 1/2 | 5 | 70 84 1/2 |
| 5 1/4 | 90 76 1/2 | 5 1/4 | 72 88 1/2 |
| 5 1/2 | 92 78 1/2 | 5 1/2 | 74 92 1/2 |
| 5 3/4 | 94 80 1/2 | 5 3/4 | 76 96 1/2 |
| 6 | 96 82 1/2 | 6 | 78 100 1/2 |
| 6 1/4 | 98 84 1/2 | 6 1/4 | 80 104 1/2 |
| 6 1/2 | 100 86 1/2 | 6 1/2 | 82 108 1/2 |
| 6 3/4 | 102 88 1/2 | 6 3/4 | 84 112 1/2 |
| 7 | 104 90 1/2 | 7 | 86 116 1/2 |
| 7 1/4 | 106 92 1/2 | 7 1/4 | 88 120 1/2 |
| 7 1/2 | 108 94 1/2 | 7 1/2 | 90 124 1/2 |
| 7 3/4 | 110 96 1/2 | 7 3/4 | 92 128 1/2 |
| 8 | 112 98 1/2 | 8 | 94 132 1/2 |
| 8 1/4 | 114 100 1/2 | 8 1/4 | 96 136 1/2 |
| 8 1/2 | 116 102 1/2 | 8 1/2 | 98 140 1/2 |
| 8 3/4 | 118 104 1/2 | 8 3/4 | 100 144 1/2 |
| 9 | 120 106 1/2 | 9 | 102 148 1/2 |
| 9 1/4 | 122 108 1/2 | 9 1/4 | 104 152 1/2 |
| 9 1/2 | 124 110 1/2 | 9 1/2 | 106 156 1/2 |
| 9 3/4 | 126 112 1/2 | 9 3/4 | 108 160 1/2 |
| 10 | 128 114 1/2 | 10 | 110 164 1/2 |
| 10 1/4 | 130 116 1/2 | 10 1/4 | 112 168 1/2 |
| 10 1/2 | 132 118 1/2 | 10 1/2 | 114 172 1/2 |
| 10 3/4 | 134 120 1/2 | 10 3/4 | 116 176 1/2 |
| 11 | 136 122 1/2 | 11 | 118 180 1/2 |
| 11 1/4 | 138 124 1/2 | 11 1/4 | 120 184 1/2 |
| 11 1/2 | 140 126 1/2 | 11 1/2 | 122 188 1/2 |
| 11 3/4 | 142 128 1/2 | 11 3/4 | 124 192 1/2 |
| 12 | 144 130 1/2 | 12 | 126 196 1/2 |

Lap Weld, extra strong, plain ends

| In. | Steel Black Galv. | In. | Wrought Iron Black Galv. |
|--------|-------------------|--------|--------------------------|
| 2 | 55 46 1/2 | 2 | 32 18 |
| 2 1/2 | 58 49 1/2 | 2 1/2 | 33 20 1/2 |
| 3 | 61 52 1/2 | 3 | 35 24 |
| 3 1/2 | 64 55 1/2 | 3 1/2 | 38 28 1/2 |
| 4 | 67 58 1/2 | 4 | 40 32 1/2 |
| 4 1/2 | 70 61 1/2 | 4 1/2 | 42 36 1/2 |
| 5 | 73 64 1/2 | 5 | 44 40 1/2 |
| 5 1/2 | 76 67 1/2 | 5 1/2 | 46 44 1/2 |
| 6 | 79 70 1/2 | 6 | 48 48 1/2 |
| 6 1/2 | 82 73 1/2 | 6 1/2 | 50 52 1/2 |
| 7 | 85 76 1/2 | 7 | 52 56 1/2 |
| 7 1/2 | 88 79 1/2 | 7 1/2 | 54 60 1/2 |
| 8 | 91 82 1/2 | 8 | 56 64 1/2 |
| 8 1/2 | 94 85 1/2 | 8 1/2 | 58 68 1/2 |
| 9 | 97 88 1/2 | 9 | 60 72 1/2 |
| 9 1/2 | 100 91 1/2 | 9 1/2 | 62 76 1/2 |
| 10 | 103 94 1/2 | 10 | 64 80 1/2 |
| 10 1/2 | 106 97 1/2 | 10 1/2 | 66 84 1/2 |
| 11 | 109 100 1/2 | 11 | 68 88 1/2 |
| 11 1/2 | 112 103 1/2 | 11 1/2 | 70 92 1/2 |
| 12 | 115 106 1/2 | 12 | 72 96 1/2 |

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base cost.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

| In. | Thick | Thin | Hot Rolled |
|----------------|-------------------|-------------------|------------|
| 1 in. o.d. | 13 R.W.G. \$ 9.46 | 13 R.W.G. \$ 8.41 | |
| 1 1/4 in. o.d. | 13 R.W.G. 11.21 | 13 R.W.G. 9.96 | |
| 1 1/2 in. o.d. | 13 R.W.G. 12.38 | 13 R.W.G. 11.00 | |
| 1 3/4 in. o.d. | 13 R.W.G. 14.09 | 13 R.W.G. 12.51 | |
| 2 in. o.d. | 13 R.W.G. 15.78 | 13 R.W.G. 14.02 | |
| 2 1/4 in. o.d. | 13 R.W.G. 17.60 | 13 R.W.G. 15.63 | |
| 2 1/2 in. o.d. | 12 R.W.G. 19.37 | 12 R.W.G. 17.21 | |
| 2 3/4 in. o.d. | 12 R.W.G. 21.22 | 12 R.W.G. 18.85 | |
| 3 in. o.d. | 12 R.W.G. 22.49 | 12 R.W.G. 19.98 | |
| 3 1/4 in. o.d. | 12 R.W.G. 23.60 | 12 R.W.G. 20.97 | |
| 3 1/2 in. o.d. | 11 R.W.G. 45.19 | 11 R.W.G. 40.15 | |
| 3 3/4 in. o.d. | 11 R.W.G. 29.79 | 11 R.W.G. 26.47 | |
| 4 in. o.d. | 10 R.W.G. 36.96 | 10 R.W.G. 32.83 | |
| 5 in. o.d. | 9 R.W.G. 56.71 | 9 R.W.G. 50.38 | |
| 6 in. o.d. | 7 R.W.G. 87.07 | 7 R.W.G. 77.35 | |

Extra for less-carload quantities:

| | |
|--|----------|
| 25,000 lb. or ft. to 39,999 lb. or ft. | 5 % |
| 12,000 lb. or ft. to 24,999 lb. or ft. | 12 1/2 % |
| 6,000 lb. or ft. to 11,999 lb. or ft. | 25 % |
| 2,000 lb. or ft. to 5,999 lb. or ft. | 35 % |
| Under 2,000 lb. or ft. | 50 % |

CAST IRON WATER PIPE

Per Net Ton
*6-in. and larger, del'd Chicago \$55.00
6-in. and larger, del'd New York 53.00
*6-in. and larger, Birmingham. 47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles... 56.00
F.o.b. dock, Seattle... 56.00
4-in., f.o.b. dock, San Francisco or Los Angeles... 59.00
F.o.b. dock, Seattle... 59.00

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$41, Birmingham, and \$49.50, delivered Chicago; and 4-in. pipe, \$44, Birmingham, and \$2.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVES, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
1/2 in. x 6 in. and smaller... 65 and 5*
Larger and longer up to
1 in. 60 and 10*
1 1/4 in. and larger... 60 and 5*
Lag bolts 60 and 10*
Plow bolts, Nos. 1, 2, 3
and 7 65 and 5
Hot pressed nuts, and c.p.c.
and t nuts, square or hex,
blank or tapped:
1/2 in. and smaller 65 and 5*
9/16 in. to 1 in. inclusive... 60 and 10*
1 1/4 in. and larger 60 and 5*

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

| | |
|---|---------------|
| 1/2 in. and smaller | 60 and 20 |
| 9/16 in. to 1 in. inclusive | 60 and 15 |
| 1 1/4 in. and larger | 60 and 12 1/2 |
| Stove bolts in packages, nuts attached | 72 1/2 |
| Stove bolts in packages, with nuts separate | 72 1/2 and 5 |
| Stove bolts in bulk | 81 1/2 |

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lbs.

F.o.b. Pittsburgh or Cleveland... \$3.60
F.o.b. Chicago or Birmingham... 3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh 70
F.o.b. Cleveland 70
F.o.b. Chicago and Birmingham... 70

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller 50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller 75
Milled headless set screws, cut thread 1/4 in. and smaller... 75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller 60
Upset set screws, cup and oval points 75
Milled studs 65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base 3.00c.
Delivered, Detroit 3.15c.

| S.A.E. | Alloy | Differential |
|----------------------|-------|--------------|
| Numbers | | per 100 lb. |
| 200 (1 1/4% Nickel) | | \$0.35 |
| 2100 (1 1/4% Nickel) | | 0.75 |
| 2300 (3 1/2% Nickel) | | 1.55 |

| | |
|---|--------|
| 2500 (5% Nickel) | \$2.25 |
| 3100 Nickel-chromium | 0.70 |
| 3200 Nickel-chromium | 1.35 |
| 3300 Nickel-chromium | 3.80 |
| 3400 Nickel-chromium | 3.20 |
| 4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum) | 0.55 |
| 4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum) | 0.75 |
| 4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni) | 1.10 |
| 5100 Chrome steel (0.60-0.90 Cr.) | 0.35 |
| 5100 Chrome steel (0.80-1.10 Cr.) | 0.45 |
| 5100 Chromium spring steel | 0.15 |
| 6100 Chromium-vanadium bar | 1.20 |
| 6100 Chromium-vanadium spring steel | 0.85 |
| Chromium-nickel-vanadium | 1.50 |
| Carbon-vanadium | 0.85 |

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

| No. | No. 304 | No. 302 |
|-------------------|---------|---------|
| Forging billets | 21.25c. | 20.40c. |
| Bars | 25c. | 24c. |
| Plates | 29c. | 27c. |
| Structural shapes | 25c. | 24c. |
| Sheets | 36c. | 34c. |
| Hot-rolled strip | 23.50c. | 21.50c. |
| Cold-rolled strip | 30c. | 28c. |
| Drawn wire | 25c. | 24c. |

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

| | Per Net Ton |
|--|---------------------|
| Plates | 3.70c. |
| Structural shapes | 3.70c. |
| Soft steel bars and small shapes | 3.80c. |
| Reinforcing steel bars | 3.80c. |
| Cold-finished and screw stock: | |
| Rounds and hexagons | 4.15c. |
| Squares and flats | 4.15c. |
| Hot rolled strip incl. 3/16 in. thick, under 24 in. wide | 4.00c. |
| Hoops | 4.50c. |
| Hot-rolled annealed sheets (No. 24), 10 or more bundles | 4.50c. |
| Galv. sheets (No. 24), 10 or more bundles | 5.15c. |
| Hot-rolled sheets (No. 10) | 3.75c. |
| Galv. corrug. sheets (No. 28), per square (more than 3750 lb.) | \$4.48 |
| Spikes, large | 1 to 24 kegs 3.90c. |
| | Per Cent Off List |
| Track bolts, all sizes, per 100 count | 55 |
| Machine bolts, 100 count | ** |
| Carriage bolts, 100 count | ** |
| Nuts, all styles, 100 count | ** |
| Large rivets, base per 100 lb. | \$4.35 |
| Wire, black, soft ann'd, base per 100 lb. | 3.45c. |
| Wire, galv. soft, base per 100 lb. | 3.85c. |
| Common wire nails, per keg | 3.00c. |
| Cement coated nails, per keg | 3.00c. |

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO Base per Lb.

| Plates and structural shapes | 3.75c. |
|---|-------------------|
| Soft steel bars, rounds | 3.55c. |
| Soft steel bars, squares and hexagons | 4.00c. |
| Cold-fin. steel bars: | |
| Rounds and hexagons | 4.30c. |
| Flats and squares | 4.30c. |
| Hot-rolled strip | 4.10c. |
| Hot-rolled annealed sheets (No. 24) | 4.60c. |
| Galv. sheets (No. 24) | 5.25c. |
| Spikes (keg lots) | 4.40c. |
| Track bolts (keg lots) | 5.60c. |
| Rivets, structural (keg lots) | 4.60c. |
| Rivets, boiler (keg lots) | 4.70c. |
| | Per Cent Off List |
| Machine bolts | *60 |
| Carriage bolts | *60 |
| Lag screws | *55 and 5 |
| Hot-pressed nuts, sq. tap or blank | *60 |
| Hot-pressed nuts, hex. tap or blank | *60 |
| Hex. head cap screws | 60 |
| Cut point set screws | 75 |
| Flat head bright wood screws | 62 and 20 |
| Spring cotters | 45 |
| Stove bolts in full packages | 72½ |
| Rd. hd. tank rivets, 7/16 in. and smaller | 55 |
| Wrought washers | \$4.00 off list |
| Black ann'd wire per 100 lb. to mfg. trade (No. 14 and heavier) | \$4.55 |
| Com. wire nails, 15 kegs or more, per keg | \$3.20 |
| Cement c'd nails, 15 kegs or more, per keg | \$3.20 |

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

| | Base per Lb. |
|-------------------------------------|----------------|
| Plates, ¼ in. and heavier | 4.00c. |
| Structural shapes | 3.97c. |
| Soft steel bars, round | 4.12c. |
| Iron bars, Swed. char-coal | 6.50 to 7.00c. |
| Cold-fin. shafting and screw stock: | |
| Rounds and hexagons | 4.57c. |
| Flats and squares | 4.57c. |

| Cold-rolled; strip, soft and quarter hard | 3.92c. |
|---|-------------------|
| Hoops | 4.32c. |
| Bands | 4.32c. |
| Hot-rolled sheets (No. 10) | 4.07c. |
| Hot-rolled ann'd sheets (No. 24*) | 4.82c. |
| Galvanized sheets (No. 24*) | 5.72c. |
| Long terme sheets (No. 24) | 6.20c. |
| Armco iron, galv. (No. 24†) | 6.25c. |
| Toncan iron, galv. (No. 24†) | 6.25c. |
| Galvanneal (No. 24†) | 6.60c. |
| Armco iron, hot-rolled annealed (No. 24†) | 5.65c. |
| Toncan iron, hot-rolled annealed (No. 24†) | 5.65c. |
| Armco iron hot-rolled (No. 10†) | 4.60c. |
| Toncan iron, hot-rolled (No. 10†) | 4.60c. |
| Cold-rolled sheets (No. 20) less than 1000 lbs. | |
| Standard quality | 5.40c. |
| Deep drawing | 6.05c. |
| Stretcher leveled | 6.05c. |
| SAE, 2300, hot-rolled | 7.82c. |
| SAE, 3100, hot-rolled | 6.37c. |
| SAE, 6100, hot-rolled, annealed | 10.52c. |
| SAE, 2300, cold-rolled | 9.00c. |
| SAE, 3100, cold-rolled, annealed | 8.55c. |
| Floor plate, ½ in. and heavier | 5.90c. |
| Standard tool steel | 12.50c. |
| Wire, black, annealed (No. 9) | 4.35c. |
| Wire, galv. (No. 9) | 4.60c. |
| Tire steel, 1 x ½ in. and larger | 4.11c. |
| Open-hearth spring steel | 4.75c. to 10.25c. |
| Common wire nails, base per keg | \$3.40 |
| | Per Cent Off List |
| Machine bolts, square head and nut: | |
| All diameters. Prices on application | |
| Carriage bolts, cut thread: | |
| All diameters. Prices on application | |

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS Base per Lb.

| Plates and struc. shapes | 3.99c. |
|--|-------------------|
| Bars, soft steel (rounds and flats) | 4.09c. |
| Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds) | 4.24c. |
| Cold-fin. rounds, shafting, screw stock | 4.54c. |
| Hot-rolled annealed sheets (No. 24) | 4.84c. |
| Galv. sheets (No. 24*) | 5.49c. |
| Hot-rolled sheets (No. 10) | 4.09c. |
| Black corrug. sheets (No. 24*) | 4.89c. |
| 2 galv. corrug. sheets | 5.51c. |
| Structural rivets | 4.91c. |
| Boiler rivets | 5.04c. |
| | Per Cent Off List |
| Tank rivets, 7/16 in. and smaller | 55 |
| Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities | 65 |

*No. 26 and lighter take special prices.

PHILADELPHIA

| | Base Per Lb. |
|--|--------------|
| *Plates, ¼-in. and heavier | 3.80c. |
| *Structural shapes | 3.80c. |
| *Soft steel bars, small shapes, iron bars (except bands) | 3.90c. |
| †Reinforc. steel bars, sq. twisted and deformed | 3.21c. |
| Cold-finished steel bars | 4.53c. |
| *Steel hoops | 4.25c. |
| *Steel bands, No. 12 and 3/16 in. incl. | 4.00c. |
| Spring steel | 5.40c. |
| †Hot-rolled anneal. sheets (No. 24) | 4.65c. |
| †Galvanized sheets (No. 24) | 5.30c. |
| *Hot-rolled annealed sheets (No. 10) | 3.90c. |
| Diam. pat. floor plates, ¼ in. | 5.45c. |

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.
†For less than 2000 lb.

CLEVELAND

| | Base per Lb. |
|--------------------------|--------------|
| Plates and struc. shapes | 3.86c. |

| Soft steel bars | 3.75c. |
|--|-------------------|
| †Reinforc. steel bars | 2.60c. |
| ‡Cold-finished steel bars | 4.30c. |
| Hot-rolled strip, 6 in. wide and under | 4.16c. |
| Cold-finished strip | 3.60c. |
| Hot-rolled annealed sheets (No. 24) | 4.66c. |
| Galvanized sheets (No. 24) | 5.31c. |
| Hot-rolled sheets (No. 10) | 3.91c. |
| Hot-rolled 3/16 in. 24 to 48 in. wide sheets | 3.91c. |
| Floor plates, 3/16 in. and heavier | 5.76c. |
| *Black ann'd wire, per 100 lb. | \$3.40 |
| *No. 9 galv. wire, per 100 lb. | 3.80 |
| *Com. wire nails, base per keg | 2.95 |
| | Per Cent Off List |
| Machine and carriage bolts, small | 65 and 5 |
| Large | 60 and 10 |
| Nuts, 100 count | |
| ½ in. and smaller | 65 and 5 |
| 9/16 in. to 1 in. | 60 and 10 |

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI Base per Lb.

| Plates and struc. shapes | 3.95c. |
|--|----------------------|
| Floor plates | 5.85c. |
| Bars, rounds, flats and angles | 4.05c. |
| Other shapes | 4.20c. |
| Rail steel reinforce. bars | 3.75c. |
| Hoops and bands, 3/16 in. and lighter | 4.25c. |
| Cold-finished bars | 4.50c. |
| Hot-rolled annealed sheets (No. 24) 3500 lb. or more | 4.60c. |
| Galv. sheets (No. 24) 3500 lb. or more | \$5.25 |
| Hot-rolled sheets (No. 10) | 4.00c. |
| Small rivets | 55 per cent off list |
| No. 9 ann'd wire, per 100 lb. (1000 lb. or over) | \$2.88 |
| Com. wire nails, base per keg: | |
| Any quantity less than carload | 3.04 |
| Cement c'd nails, base 100-lb. keg | 3.50 |
| Ch'n. lin. per 100 lb. | 8.35 |
| | Net per 100 Ft. |
| Seamless steel boiler tubes, | |
| 2-in. | \$21.80 |
| 4-in. | 52.45 |
| Lap-welded steel boiler tubes, | |
| 2-in. | 20.73 |
| 4-in. | 48.41 |

BUFFALO Base per Lb.

| | |
|---|--------|
| Plates | 3.92c. |
| Struc. shapes | 3.80c. |
| Soft steel bars | 3.90c. |
| Reinforcing bars | 3.10c. |
| Cold-fin. flats and sq. | 4.35c. |
| Rounds and hex. | 4.35c. |
| Cold-rolled strip steel | 3.79c. |
| Hot-rolled annealed sheets (No. 24) | 4.80c. |
| Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide) | 3.97c. |
| Galv. sheet (No. 24) | 5.45c. |
| Bands | 4.22c. |
| Hoops | 3.97c. |
| Heavy hot-rolled sheets | 3.97c. |
| Com. wire nails, base per keg | \$3.26 |
| Black wire, base per 100 lb. (2500-lb lots or under) | 4.55c. |
| (Over 2500 lb.) | 4.45c. |

BOSTON Base per Lb.

| | |
|--|--------------|
| Channels, angles | 4.20c. |
| Tees and zeos, under 3" | 4.45c. |
| H beams and shapes | 4.07c. |
| Plates — Sheared, tank and univ. mill, ¼ thick and heavier | 4.08c. |
| Floor plates, diamond pattern | 6.03c. |
| Bar and bar shapes (mild steel) | 4.20c. |
| Bands 3/16 in. thick and No. 12 ga. incl. | 4.40 to 5.40 |
| Half rounds, half ovals, ovals and bevels | 5.45c. |
| Tire steel | 5.45c. |
| Cold-rolled strip steel | 3.845c. |
| Cold-finished rounds, squares and hexagons | 4.65c. |
| Cold-finished flats | 4.65c. |
| Blue annealed sheets, No. 10 ga. | 3.90c. |
| One pass cold-rolled sheets No. 24 ga. | 4.50c. |
| Galvanized steel sheets, No. 24 ga. | 5.05c. |
| Lead coated sheets, No. 24 ga. | 6.15c. |

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

| | |
|---|--------|
| Soft steel bars | 3.94c. |
| Structural shapes | 3.95c. |
| Plates | 3.95c. |
| Floor plates | 5.85c. |
| Hot-rolled annealed sheets | |
| (No. 24)* | 4.69c. |
| Hot-rolled sheets (No. 10) | 3.94c. |
| Galvanized sheets (No. 24)* | 5.40c. |
| Bands and hoops | 4.19c. |
| Cold-finished bars | 4.30c. |
| Cold-rolled strip | 3.78c. |
| Hot-rolled alloy steel (S.A.E. 3100 Series) | 6.44c. |
| Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c. | |

* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

Base per Lb.

| | |
|--|--------|
| Plates and structural shapes.. | 3.86c. |
| Soft steel bars, rounds up to 8 in., flats and fillet angles.... | 3.96c. |
| Soft steel bars, squares and hexagons | 4.11c. |
| Hot-rolled strip | 4.21c. |
| Hot-rolled annealed sheets (No. 24) | 4.71c. |
| Galvanized sheets (No. 24).... | 5.36c. |
| Cold-finished steel bars | 4.41c. |
| Structural rivets (keg lots).... | 4.71c. |
| Boiler rivets, cone head (keg lots) | 4.81c. |
| Track spikes (keg lots) | 4.26c. |
| Track bolts (keg lots) | 5.71c. |
| Black annealed wire (No. 6 to No. 9 incl.) | 4.66c. |
| Com. wire nails and cement coated nails | |
| 1 to 14 kegs | 3.31c. |

Per Cent Off List

| | |
|---|-------|
| Machine bolts and carriage bolts, 1/2x6 and smaller | 65-10 |
| Larger | 65 |
| Coach and lag screws | 65 |
| Hot-pressed nuts, sq. and hex. tapped or blank (keg lots).... | 65 |

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

| | |
|------------------------------------|--------|
| Mild steel bars, rounds | 4.10c. |
| Structural shapes | 4.00c. |
| Plates | 4.00c. |
| Cold-finished bars | 4.55c. |
| Hot-rolled annealed sheets, No. 24 | 4.85c. |
| Galvanized sheets, No. 24 | 5.50c. |

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.

| | |
|--|--------|
| Mild steel bars and small shapes | 3.85c. |
| Structural shapes | 3.90c. |
| Reinforcing bars, 5 to 15 tons. | 3.11c. |
| Plates | 3.90c. |
| Hot-rolled sheets, No. 10 | 3.80c. |
| Bands | 3.85c. |
| Hoops | 4.10c. |
| Special threading steel | 3.95c. |
| Checkered floor plates 1/4 in. and heavier | 5.90c. |
| Galvanized bars, bands and small shapes | 6.35c. |
| Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more | \$4.50 |

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

Base per Lb.

| | |
|-------------------------------------|--------|
| Mild steel bars | 3.96c. |
| Iron bars | 3.96c. |
| Reinforcing bars | 3.96c. |
| Structural shapes | 4.01c. |
| Plates | 4.01c. |
| Hot-rolled sheets No. 10 | 3.91c. |
| Hot-rolled annealed sheets, No. 24* | 4.06c. |
| Galvanized sheets No. 24* | 4.76c. |
| Steel bands | 4.16c. |
| Cold-finished bars | 4.86c. |

* Plus mill item extra.

MEMPHIS

Base per Lb.

| | |
|-------------------------------------|--------|
| Mild steel bars | 4.31c. |
| Shapes, bar size | 4.31c. |
| Iron bars | 4.31c. |
| Structural shapes | 4.21c. |
| Plates | 4.21c. |
| Hot-rolled sheets, No. 10 | 4.26c. |
| Hot-rolled annealed sheets, No. 24 | 4.91c. |
| Galvanized sheets, No. 24 | 5.66c. |
| Steel bands | 4.56c. |
| Cold-drawn rounds | 4.80c. |
| Cold-drawn flats, squares, hexagons | 6.80c. |
| Structural rivets | 4.35c. |
| Bolts and nuts, per cent off list | 55 |
| Small rivets, per cent off list | 60 |

NEW ORLEANS

Base per Lb.

| | |
|-----------------------------------|--------|
| Mild steel bars | 4.20c. |
| Reinforcing bars | 3.14c. |
| Structural shapes | 4.10c. |
| Plates | 4.10c. |
| Hot-rolled sheets, No. 10 | 4.10c. |
| Steel bands | 4.75c. |
| Cold-finished steel bars | 5.10c. |
| Structural rivets | 4.25c. |
| Boiler rivets | 4.25c. |
| Common wire nails, base per keg | \$3.30 |
| Bolts and nuts, per cent off list | 65 |

PACIFIC COAST

Base per Lb.

| | San Francisco | Los Angeles | Seattle |
|--|---------------|-------------|---------|
| Plates, tank and U. M. | 4.05c. | 4.30c. | 4.25c. |
| Shapes, standard | 4.05c. | 4.30c. | 4.25c. |
| Soft steel bars.. | 4.20c. | 4.30c. | 4.45c. |
| Reinforcing bars, f.o.b. cars dock Pacific ports | 2.975c. | 2.975c. | 3.625c. |
| Hot-rolled annealed sheets (No. 24) | 5.15 | 5.05c. | 5.35c. |
| Hot-rolled sheets (No. 10) | 4.30c. | 4.50c. | 4.50c. |
| Galv. sheets (No. 24 and lighter) | 5.85c. | 5.55c. | 5.90c. |
| Galv. sheets (No. 22 and heavier) | 6.10c. | 5.70c. | 5.90c. |
| Cold-finished steel | | | |
| Rounds | 6.80c. | 6.85c. | 7.10c. |
| Squares and hexagons | 8.05c. | 8.10c. | 7.10c. |
| Flats | 8.55c. | 8.60c. | 8.10c. |
| Common wire nails—base per keg less carload | \$3.65 | \$3.60 | \$3.70 |

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

| | |
|---|---------|
| First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois | \$54.00 |
| First quality, New Jersey | 56.00 |
| Select, Ohio | 49.00 |
| Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois | 49.00 |
| Second quality, New Jersey | 51.00 |
| No. 1, Ohio | 46.00 |
| Ground fire clay, per ton | 8.00 |
| 5 per cent trade discount on fire clay brick. | |

Silica Brick

Per 1000 f.o.b. Works

| | |
|--|---------|
| Pennsylvania | \$54.00 |
| Chicago District | 63.00 |
| Birmingham | 54.00 |
| Silica cement per net ton (Eastern) | 9.50 |
| 5 per cent trade discount on silica brick. | |

Chrome Brick

Per Net Ton

| | |
|---|---------|
| Standard f.o.b. Baltimore. Plymouth Meeting and Chester | \$49.00 |
| Chemically bonded f.o.b. Baltimore. Plymouth Meeting and Chester, Pa. | 49.00 |

Magnesite Brick

Per Net Ton

| | |
|--|---------|
| Standard f.o.b. Baltimore and Chester, Pa. | \$69.00 |
| Chemically bonded, f.o.b. Baltimore | 59.00 |

Grain Magnesite

Per Net Ton

| | |
|--|---------|
| Imported, f.o.b. Baltimore and Chester, Pa. (in sacks) | \$45.00 |
| Domestic, f.o.b. Baltimore and Chester, in sacks | 43.00 |
| Domestic, f.o.b. Chewelah, Wash. | 25.00 |

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

| | |
|---|---------|
| F.o.b. Everett, Mass. | \$25.75 |
| F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md. | 25.00 |
| Delivered Brooklyn | 27.27 |
| Delivered Newark or Jersey City | 26.39 |
| Delivered Philadelphia | 25.76 |
| F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. | 24.00 |
| F.o.b. Jackson, Ohio | 25.75 |
| Delivered Cincinnati | 24.07 |
| F.o.b. Duluth | 24.50 |
| F.o.b. Provo, Utah | 21.00 |
| Delivered San Francisco, Los Angeles or Seattle | 25.00 |
| F.o.b. Birmingham* | 20.38 |

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

| | |
|--|---------|
| F.o.b. Everett, Mass. | \$25.75 |
| F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md. | 24.50 |
| F.o.b. Buffalo | 23.00 |
| F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. | 23.50 |
| Delivered Cincinnati | 24.51 |
| Delivered Canton, Ohio | 24.76 |
| Delivered Mansfield, Ohio | 25.26 |
| F.o.b. Jackson, Ohio | 25.50 |
| F.o.b. Birmingham | 19.00 |

Bessemer

| | |
|--|---------|
| F.o.b. Everett, Mass. | \$26.75 |
| F.o.b. Bethlehem, Birdsboro and Swedeland, Pa. | 26.00 |
| Delivered Boston Switching District | 26.50 |
| Delivered Newark or Jersey City | 27.39 |
| Delivered Philadelphia | 26.76 |
| F.o.b. Buffalo and Erie, Pa., and Duluth | 25.00 |
| F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago | 24.50 |
| F.o.b. Birmingham | 25.50 |
| Delivered Cincinnati | 25.51 |
| Delivered Canton, Ohio | 25.76 |
| Delivered Mansfield, Ohio | 26.26 |

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.

Gray Forge

Valley or Pittsburgh furnace...\$23.50

Charcoal

| | |
|-----------------------------|---------|
| Lake Superior furnace | \$27.00 |
| Delivered Chicago | 30.04 |

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

| | |
|-----------------------------------|---------|
| No. 1 fdy., sil. 2.25 to 2.75.... | \$26.50 |
| No. 2 fdy., sil. 1.75 to 2.25.... | 25.50 |
| Malleable | 26.00 |
| Basic | 25.50 |

Delivered Montreal

| | |
|-----------------------------------|---------|
| No. 1 fdy., sil. 2.25 to 2.75.... | \$27.50 |
| No. 2 fdy., sil. 1.75 to 2.25.... | 27.00 |
| Malleable | 27.50 |
| Basic | 27.00 |

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21%

F.o.b. New Orleans

Electric Ferrosilicon

Per Gross Ton Delivered

| | |
|----------------------|---------|
| 50% (carloads) | \$69.50 |
| 50% (ton lots) | 77.00 |
| 75% (carloads) | 126.00 |
| 75% (ton lots) | 136.00 |

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

| | |
|-----------------------|---------|
| 10.00 to 10.50% | \$33.50 |
| 10.51 to 11.00% | 34.00 |
| 11.01 to 11.50% | 34.50 |
| 11.51 to 12.00% | 35.00 |
| 12.01 to 12.50% | 35.50 |
| 12.51 to 13.00% | 36.00 |
| 13.01 to 13.50% | 36.50 |
| 13.51 to 14.00% | 37.00 |
| 14.01 to 14.50% | 37.50 |
| 14.51 to 15.00% | 38.00 |
| 15.01 to 15.50% | 38.50 |
| 15.51 to 16.00% | 39.00 |
| 16.01 to 16.50% | 39.50 |
| 16.51 to 17.00% | 40.00 |

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads....

Ferrotungsten, lots of 5000 lb.

Ferrotungsten, smaller lots

Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract

Ferrochromium, 2% carbon

Ferrochromium, 1% carbon

Ferrochromium, 0.10% carbon

Ferrochromium, 0.06% carbon

Ferrovanadium, del. per lb. contained V.

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.

Ferrocolumbium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton

Ferrocolumbium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton

Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.

Ferromolybdenum, per lb. Mo del.

Calcium molybdate, per lb. Mo del.

Silico spiegel, per ton, f.o.b. furnace, carloads

Ton lots or less, per ton

Silico-manganese, gross ton, delivered.

3%

2.50% carbon grade

2% carbon grade

1% carbon grade

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%

Old range, non-Bessemer, 51.50%

Mesabi, Bessemer, 51.50%

Mesabi, non-Bessemer, 51.50%

High phosphorus, 51.50%

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 65 to 58% dry, Algeria

Iron, low phos., Swedish, average, 68 1/2% iron

Iron, basic or foundry, Swedish, aver. 65% iron

Iron, basic or foundry, Russian, aver. 65% iron

Man., Caucasian, washed 52%

Man., African, Indian, 44-48%

Man., African, Indian, 49-51%

Man., Brazilian, 46 to 48 1/2%

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal

Tungsten, domestic, scheelite delivered, nominal

Chrome ore (lump) c.i.f. Atlantic Seaboard, per net ton:

South African

Rhodesian, 45%

Rhodesian, 48%

Turkish, 48-49%

Turkish, 45-46%

Turkish, 44%

Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:

52%

50%

48-49%

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail

Domestic, barge and rail

No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines

Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid....

Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines....

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate

F.o.b. Bayonne or Baltimore, No. 4 industrial

Del'd Ch'go, No. 3 industrial

Del'd Ch'go, No. 5 industrial

Del'd Cleve'd, No. 3 distillate

Del'd Cleve'd, No. 4 industrial

Del'd Cleve'd, No. 5 industrial

COKE AND COAL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt

Foundry, f.o.b. Connellsville, Prompt

Foundry, by-product, Chicago ovens

Foundry, by-product, del'd New England

Foundry, by-product, del'd Newark or Jersey City

Foundry, by-product, Philadelphia

Foundry, by-product, delivered Cleveland

Foundry, by-product, delivered Cincinnati

Foundry, Birmingham

Foundry, by-product, del'd St. Louis Industrial district

Foundry, from Birmingham, f.o.b. cars docks, Pacific ports

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines....

Mine run coking coal, f.o.b. W. Pa.

Gas coal, 1/2-in. f.o.b. Pa. mines

Mine run gas coal, f.o.b. Pa. mines

Steam slack, f.o.b. W. Pa. mines

Gas slack, f.o.b. W. Pa. mines



A machine tool for shearing metal! All-steel construction, accurate, fast, with new gauging methods . . . its very appearance expresses efficiency.

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THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO



PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Federated Metals Corp., 120 Broadway, New York, a subsidiary of American Smelting & Refining Co., same address, plans new smelting and refining plant for non-ferrous metals at Whiting, Ind., where site has been selected. It will consist of one and multi-story units, with furnaces, power house, machine shop, storage and distributing buildings. Cost about \$1,000,000 with equipment. Chicago offices are at 600 West Forty-first Street; Victor B. Seidel, last noted address, is chief engineer in charge.

American Locomotive Co., 30 Church Street, New York, has approved plans for one-story addition to plant at Schenectady, N. Y., 100 x 150 ft., with extension, 28 x 80 ft. It will be used primarily as a hammer shop. Cost over \$85,000 with machinery. R. H. White is chief engineer in charge.

General Electric Co., Schenectady, N. Y., will take bids soon on general contract through branch offices at 5201 Santa Fe Avenue, Los Angeles, for new three-story and basement factory branch, storage and distributing plant, 161 x 215 ft., with foundations for three additional stories later, on Vignes Street, Los Angeles. Cost over \$150,000 with equipment. Albert C. Higgins, Martin Building, is architect, and E. L. Ellingwood, H. W. Hellman Building, mechanical engineer, both Los Angeles.

Continental Can Co., 100 East Forty-second Street, New York, has plans for one and multi-story addition to branch plant at New Orleans, for which general erection contract will be let soon. Cost over \$200,000 with equipment. Favrot & Reed, Nola Building, New Orleans, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 27 for cruising reduction gears and spare parts (Schedule 441), 10 6-in. gun turret training gears (Schedule 450), one motor-driven hack saw (Schedule 474) for Brooklyn Navy Yard; until April 30, air-cooling and air-conditioning plants (Schedule 487) for Brooklyn and Philadelphia yards.

American Can Co., 230 Park Avenue, New York, has let general contract to Anglin-Norcross, Ltd., 57 Bloor Street West, Toronto, Ont., for one-story addition to branch plant at Simcoe, Ont., 150 x 275 ft., primarily for storage and distribution. Cost about \$130,000 with equipment.

Quartermaster, Mitchell Field, Hempstead, N. Y., asks bids until April 27 for gray iron castings for light circular frames with covers (Proposal 568-37), galvanized conduit, galvanized boxes, wire, switches, machine screws, etc. (Proposal 568-31).

Kawneer Co., 415 Lexington Avenue, New York, manufacturer of metal store fronts, windows, doors, etc., with main plant at Niles, Mich., has leased building to be erected at 538 West Thirty-fifth Street, New York, for new factory branch, storage and distributing plant.

Contracting Officer, Office of Chief of Engineers, Munitions Building, Washington, asks bids until April 27 for one ammunition conveying system, consisting of track, 24 chain hoists and 24 trolleys, for Brooklyn yard (Proposal 52).

Quartermaster, Supply Office, Brooklyn, asks bids until May 13 for two 1000-gal. steel gasoline storage tanks and two electric-operated gasoline pumps (Proposal 626-224).

Orange Roller Bearing Co., 557 Main Street, Orange, N. J., has leased about 6000 sq. ft. in adjoining building for metal-working department, including manufacture of steel sinks and other specialties.

Power Patents Co., manufacturer of power specialties, operated by Cities Service Co., 60 Wall Street, New York, has leased former plant of Riches-Piver Co., Hillside,

N. J., totaling about 19,000 sq. ft. floor space, and will remodel for new plant.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until April 26 for one 30-gal. tilting and tumbling barrel (Circular 748).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 27 for 1700 thermocouples for engine cylinder thermometers (Schedule 446), two gas-fired pot type hardening furnaces (Schedule 460), one motor-driven swing frame grinding machine (Schedule 470) for Philadelphia Navy Yard.

Allentown-Bethlehem Gas Co., Allentown, Pa., has plans for one-story equipment storage and distributing, service and repair building, with shop facilities. Cost about \$125,000 with equipment. United Engineers & Constructors, Inc., 1401 Arch Street, Philadelphia, is engineer.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until April 27 for 62 hardened steel spiral gears (Circular 590), modernization of 24-in. Rockford hydraulic shaper at local arsenal (Circular 600).

◀ BUFFALO DISTRICT ▶

H. J. Heinz Co., 1062 Progress Street, Pittsburgh, manufacturer of canned food products, has let general contract to Irwin & Leighton, Schaff Building, Philadelphia, for new three and four-story plant, 160 x 345 ft., at Medina, N. Y. Cost over \$250,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Upson Co., Upson Point, Lockport, N. Y., manufacturer of wall board products, has plans for addition to steam power plant and installation of equipment. Cost close to \$40,000.

◀ WASHINGTON DIST. ▶

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until April 26 for three vacuum pumps (Circular 144); until May 3, one electric muffle furnace, one precision vacuum gage, one precision electric heater and other equipment (Circular 146).

Potomac Edison Co., Hagerstown, Md., has authorized addition to steam-electric generating plant at Cumberland, Md., including installation of 30,000-kw. turbo-generator unit, high-pressure boilers and auxiliary equipment. Cost close to \$3,000,000.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until May 5 for 24 2-ton motor vehicle jacks, 24 one-ton passenger car-type jacks, and 118 open-end wrenches (Proposal 398-119); until May 10, general shop and repair equipment, including arbors, steel blocks, pipe cutters, drill gages, files, reamers, compression, piston, and vacuum gages, soldering iron furnaces, tools, calipers, etc. (Circular 398-115); until May 11, electric-operated grinding reseaters equipment for engine valve seats (Circular 398-127).

Bohn Refrigerator Co., Baltimore, recently organized with capital of \$1,000,000 by interests formerly identified with company of similar name previously operating at St. Paul, Minn., has taken over plant on Haven Street, Highlandtown, Baltimore, for manufacture of porcelain enameled refrigerators and parts. New company will take over refrigerator manufacturing division of C. Hoffberger Co., 409 Alsquith Street, Baltimore.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 27 for one power-driven circle shear and flanging attachment (Circular 477) for

Annapolis Navy Yard; one motor-driven, centrifugal, condenser circulating pumping unit (Circular 416) for Norfolk, Va., yard; steel forgings (Circular 420), copper nickel alloy forgings (Circular 421), naval brass forgings (Circular 419) for Newport, R. I., Naval Station; one motor-driven oxygen torch-type cutting machine (Circular 411) for Portsmouth, Va., station; equipment for mechanical revolution counter system (Schedule 424) for Boston yard; one motor-driven toolmaker's engine lathe (Schedule 437), admiralty metal condenser tubes and copper nickel alloy condenser tubes (Schedule 439), one 125-kva. diesel engine-generator (Schedule 449), wire rope and seizing strand (Schedule 394), alloy steel forgings (Schedule 319), seven windlasses and spare parts (Schedule 418), steel boiler tubes (Schedule 417) for Eastern and Western yards.

◀ NEW ENGLAND ▶

Bridgeport Brass Co., Grand Avenue, Bridgeport, Conn., has let general contract to Hewlett Construction Co., 1385 Iranistan Avenue, for one-story addition, for expansion in casting shop. Cost over \$35,000 with equipment. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, is architect and engineer.

Marlboro Wire Goods Co., Marlboro, Mass., has asked bids on general contract for three-story and basement addition, 70 x 160 ft. Cost over \$60,000 with equipment. O. E. Nault & Sons, 48 Hamilton Street, Worcester, Mass., are architects.

Hood Rubber Co., 98 Nichols Avenue, Watertown, Mass., has let general contract to Frederick Billings Co., 10 High Street, Boston, for two-story addition, 32 x 64 ft. Cost close to \$45,000 with equipment.

Worthington Pump & Machinery Corp., Harrison, N. J., has begun alterations and improvements in branch plant at Holyoke, Mass., closed for five years, and will replace certain present machinery preparatory to early resumption of operations. Holyoke works will be used for production of portable compressors and parts, air tools for contractors' service, rock drills and air-conditioning equipment, with facilities for employment of over 400 persons.

Raybestos - Manhattan Co., Stratford, Conn., manufacturer of brake lining, rubber specialties, etc., plans rebuilding part of plant recently destroyed by fire. Loss close to \$100,000 with equipment. Company headquarters are at Bridgeport, Conn.

◀ SOUTH ATLANTIC ▶

Glidden Co., Madison Avenue and Breen Road, Cleveland, manufacturer of paints, varnishes, oils, etc., plans new branch plant at Valdosta, Ga., where property has been acquired. It will comprise several one and multi-story units, with power house. Cost about \$200,000 with equipment.

Wilson & Co., United States Stock Yards, Chicago, has acquired property at Columbus, Ga., and will remodel for new branch meat-packing plant, to furnish requirements for group of 10 distributing plants in Southern district. Cost about \$165,000 with equipment.

Macon Gas Co., Macon, Ga., plans expansion and improvements in artificial gas plant and distributing system. Company is arranging for bond issue to total \$750,000, part of proceeds to be used for purpose noted.

◀ SOUTHWEST ▶

Owens-Illinois Can Co., Ohio Building, Toledo, Ohio, a subsidiary of Owens-Illinois Glass Co., same address, has authorized plans for new tin can and metal container plant on site recently acquired at St. Louis, with power house and other mechanical departments. Cost close to \$500,000 with equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

George Muehlebach Brewing Co., Kansas City, Mo., recently organized, Carl Muehlebach, Muehlebach Hotel, head, has taken over property at Fourth and Oak Streets, and will remodel for new brewery. General contract has been let to Rau Construction Co., 2409 Harrison Street, to include erection of several units for main brew-house, mechanical bottling plant and other operating divisions. Entire project will cost about \$450,000 with equipment. Robert A. Drum, Fontenelle Brewing Co., Omaha, Neb., is interested in Muehlebach company.

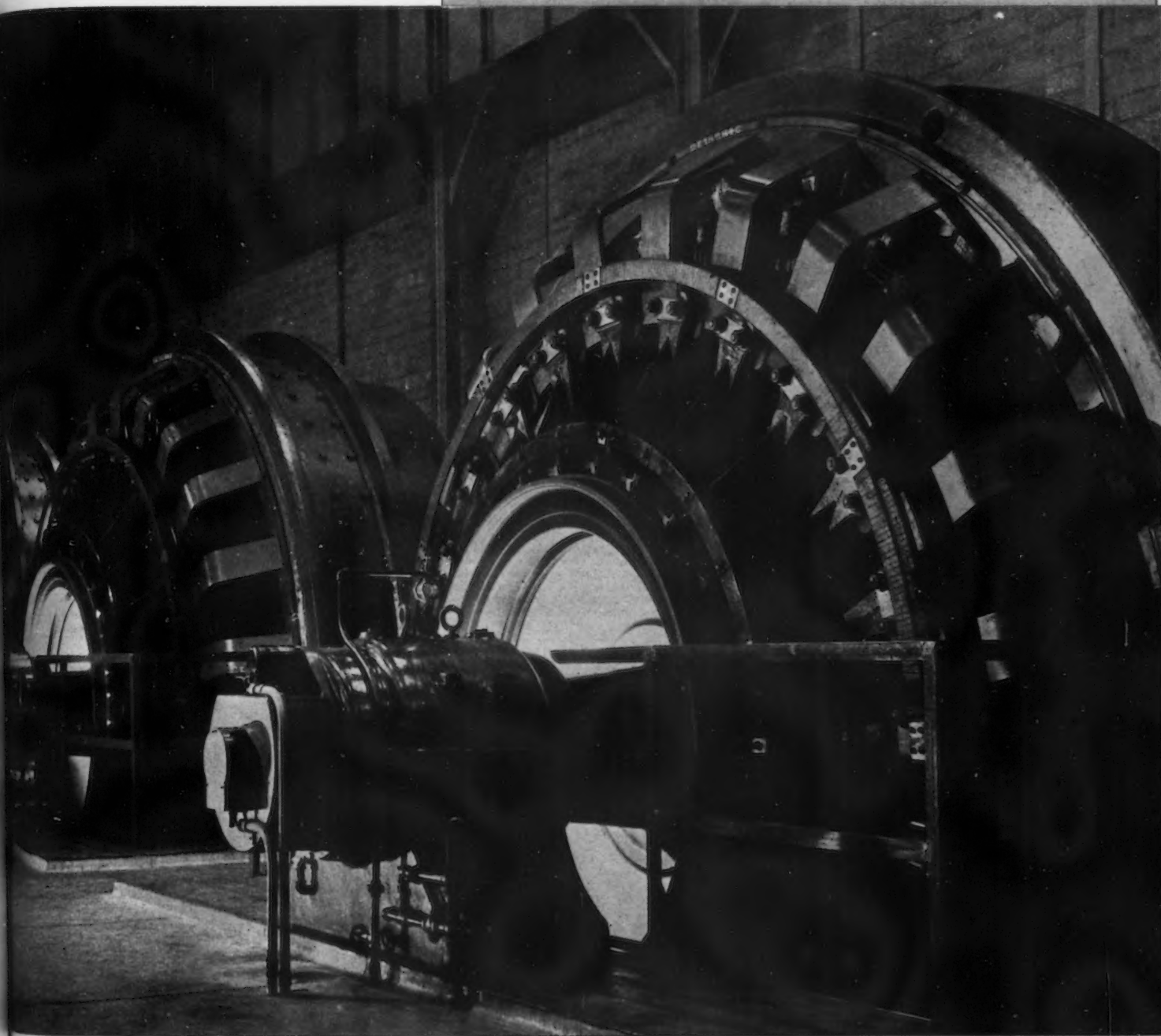
Laclede Gas Light Co., 1017 Olive Street, St. Louis, has let general contract to Woermann Construction Co., 3800 West Pine

**MODERN
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Over many years Allis-Chalmers motors have established an enviable reputation for rugged, reliable service in many outstanding installations.

Large d-c motors, such as the 5000 hp main roll drive motors shown below, have armatures with "Frog-Leg" windings. These give 100% cross-connection without the use of separate cross connectors. They give better commutation at all loads.

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ALLIS-CHALMERS



MILWAUKEE WISCONSIN

Street, for two-story addition to equipment storage and distributing building and machine shop, 61 x 70 ft. Cost about \$50,000 with equipment. Mauran, Russell & Crowell, Chemical Building, are architects.

Williams Patent Crusher & Pulverizer Co., 813 Montgomery Street, St. Louis, will take bids soon on general contract for one and two-story addition. Cost over \$50,000 with equipment. Gray & Pauley, 3800 West Pine Street, are architects.

General American Oil Co. of Texas, Slatery Building, Shreveport, La., has acquired gasoline refinery of Chief Refining Co., Gladewater, Tex., and plans expansion and improvements, including new units and installation of equipment. Additions will be made in steel tank storage and distributing division. Cost close to \$200,000 with equipment.

Barnsdall Refining Co., 1310 North Peoria Street, Tulsa, Okla., plans new bulk oil storage and distributing terminal at Corpus Christi, Tex., near Avery Point, including loading dock, steel tanks and accessories, pumping station and other structures. Cost close to \$500,000 with equipment.

◀ WESTERN PA. DIST. ▶

Aluminum Co. of America, Inc., Gulf Building, Pittsburgh, has authorized plans for new plant at Lafayette, Ind., for production of aluminum tubing, extruded aluminum shapes and other aluminum products. Cost over \$3,000,000 with machinery. This is part of an expansion program to be carried out by company in connection with present plants and new works in various parts of country during 1937, for which a gross appropriation of \$26,000,000 has been authorized.

Reliance Steel Products Co., Rankin, Pa., manufacturer of welded floor gratings and treads, and other steel specialties, has approved plans for new plant units in Christy Park district, comprising four one-story structures, 80 x 360 ft., 75 x 340 ft., 50 x 270 ft., and 50 x 150 ft., respectively, and two-story and basement office and operating building, 30 x 45 ft. Several electric-traveling cranes will be installed. Entire project will cost over \$250,000.

Standard Ultramarine Co., Fifth Avenue and Twenty-third Street, Huntington, W. Va., manufacturer of chemical specialties, ultramarine colors, etc., has plans for one-story addition, 80 x 215 ft. Cost over \$60,000 with equipment.

◀ OHIO AND INDIANA ▶

Cincinnati Shaper Co., Cincinnati, has let general contract to Ferro Concrete Construction Co., Third and Elm Streets, for one-story addition, 87 x 195 ft. Three electric traveling cranes will be installed. Cost close to \$75,000 with equipment.

Davis Machinery Co., 1 South St. Clair Street, Toledo, Ohio, manufacturer of machinery and parts, is considering erection of three-story addition, 60 x 75 ft. Cost over \$50,000 with equipment.

Joyce-Cridland Co., North Findlay Street, Dayton, Ohio, manufacturer of automobile jacks, hydraulic jacks, hoists, etc., has let general contract to H. Stock & Son, 55 Brandt Street, for one and two-story plant, 100 x 290 ft. Cost close to \$100,000 with equipment. Geyer & Neuffer, Dayton, are architects.

Ferry Machine Co., Canton, Ohio, manufacturer of machinery and parts, has let general contract to J. C. Shafer Construction Co., 1001 Huron Road, Cleveland, for one-story addition. Cost close to \$45,000 with equipment.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until April 26 for aluminum alloy tubing and metal spraying wire (Circular 664); until April 28, thermocouple indicator and tester leads (Circular 656), one compressor for V-belt drive from flywheel, with minimum capacity of 1500 cu. ft. of air per min. (Circular 655); until April 30, 224,000 aluminum alloy washer-head screws (Circular 662); until May 3, fuse links, cartridge fuses, plug attachment bodies, battery clips and other equipment (Circular 663).

J. H. Seagram & Sons, Lawrenceburg, Ind., distillers, have let general contract to J. & E. Warm Co., 2335 Florence Street, Cincinnati, for six-story and basement addition, 110 x 200 ft., for storage and distribution. Cost over \$300,000 with equipment.

Metal Products Co., Columbus, Ind., manufacturer of metal parts for stoves and ranges, and other finished metal goods, has let general contract to Miller Lumber Co., North Vernon, Ind., for one-story plant, 50 x 100 ft., at North Vernon. Cost about \$40,000 with equipment. Company was organized

about two months ago by Thomas Evans and has been operating in temporary quarters at Columbus, which works will be removed to North Vernon, where more than twice present capacity will be arranged.

◀ MICHIGAN DISTRICT ▶

Pontiac Motor Division, General Motors Corp., Pontiac, Mich., has let general contract to Austin Co., Detroit, for one-story addition. Cost close to \$50,000 with equipment.

Edwin I. Guthman & Co., Inc., 400 South Peoria Street, Chicago, manufacturer of radio equipment and parts, has leased former four-story plant of Fine Arts Furniture Co., at Grand Rapids, Mich., about 20,000 sq. ft. floor space, for new branch plant.

Jefferson Brewing Co., Ford Building, Detroit, has let general contract to Kreighoff Co., 6661 French Road, for new eight-story and basement brewery on Jefferson Avenue, with smaller adjoining units. Cost about \$400,000 with equipment. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

Globe Oil & Refining Co., 59 East Van Buren Street, Chicago, plans immediate construction of new bulk oil storage and distributing terminal on site recently acquired at Holland, Mich., with waterfront facilities. It will include loading dock, pumping station and other structures. Cost over \$60,000 with equipment. Company will ship oil from refinery at Falmouth, Ill., to new terminal.

Kalamazoo Vegetable Parchment Co., Parchment, Kalamazoo, Mich., has let general contract to M. C. J. Billingham, Kalamazoo, engineer and contractor, for two-story addition to paper mill, 94 x 530 ft. Part of unit will be used for storage and distribution. Cost over \$250,000 with machinery.

◀ SOUTH CENTRAL ▶

Swift & Co., Union Stock Yards, Chicago, will receive bids on general contract until April 27 for new branch packing plant at Lake Charles, La., including a main four-story and basement unit and several one-story buildings, with power house, sewage treatment plant, machine shop and other structures. Cost close to \$500,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until May 10 for two oil pressure governor systems for two 48,000-hp. hydraulic turbines at generating station at Pickwick Landing Dam.

Kentucky Sour Mash Distillery, Inc., Owensboro, Ky., recently organized, Courtney Combs, president, has let general contract to R. W. Key, Murray, Ky., for new distilling plant on site of former Green River Distillery, destroyed by fire several years ago. It will consist of main four-story and basement unit, 48 x 62 ft., with two-story wing, 38 x 60 ft., and smaller structures, with boiler house. Later, additional buildings will be erected, including storage and distributing units, grain-drying building and mechanical-bottling works. Entire project will cost over \$100,000 with equipment. Walter C. Wagner, Breslin Building, Louisville, is architect. Wilbur K. Miller is secretary.

United States Engineer Office, Vicksburg, Miss., asks bids until May 10 for reamers, dies, taps and twist drills (Circular 225).

Hedges-Walsh-Weidner Co., South Grove Street, Chattanooga, Tenn., manufacturer of boilers, tanks and similar products, a subsidiary of Combustion Engineering Co., New York, has let contract to Converse Bridge & Steel Co., 2408 Vance Avenue, for one-story addition, 90 x 200 ft. Cost close to \$150,000 with equipment.

Klaene-Kruckemeyer Foundry & Engineering Co., Covington, Ky., has been organized by Kruckemeyer Foundry Co., Blanchester, Ohio, and Frank Klaene, formerly of Star Foundry Co., Covington, and has established a plant at 1320-24 Russell Street for manufacture of a general line of commercial and machine tool castings.

◀ MIDDLE WEST ▶

John Amann, 5832 South Green Street, Chicago, manufacturer of wire products, has asked bids on general contract for one-story addition, 65 x 115 ft. Cost over \$50,000 with equipment.

Western Rust Proof Co., 2139 West Walnut Street, Chicago, manufacturer of metal specialties, has let general contract to James P. Adams, 201 North Wells Street, for one and one-half story addition, 25 x 125 ft. Cost about \$40,000 with equipment. D. F. Finlayson, 6793 Oxford Street, is architect.

United States Engineer Office, Rock Is-

land, Ill., asks bids until May 7 for power, control and lighting system at lock and dam No. 12, Mississippi River, near Belleville, Iowa, including transformers, regulators, switches and other electrical installation, storage yard lighting system, gasoline-electric standby power unit, two electric-operated tow-haulage units, two hand-operated traveling bridge cranes, two recording gaging stations, sump and fuel oil pumping units and other mechanical equipment (Circular 193).

Estherville Packing Co., Estherville, Iowa, meat packer, recently organized as a subsidiary of Tobin Packing Co., Fort Dodge, Iowa, has let general contract to H. A. Peters Co., 19 South La Salle Street, Chicago, for one-story and basement packing plant. Cost close to \$185,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Burd Piston Ring Co., 2401 Tenth Street, Rockford, Ill., has let general contract to Security Building Co., 717 East Jefferson Street, for one-story addition, 40 x 65 ft., for expansion in heat-treating division.

Dayton Rogers Mfg. Co., 1845 East Franklin Street, Chicago, manufacturer of stamped metal products, has begun work on one-story and basement plant, 120 x 140 ft., at 2838 Thirtieth Avenue South, for which general contract recently was let to Splady & Haugenson, Pence Building. Cost over \$50,000 with equipment. Johnson & Backstrom, Roanoke Building, are architects.

Robbins Flooring Co., Rhinelander, Wis., has plans by G. G. Arnzen, architect, Escanaba, Mich., for new flooring mill, 104 x 375 ft., and dry kilns, 123 x 143 ft., at Newberry, Mich. Investment with machinery is estimated at \$250,000. Paul Abendroth is manager at Newberry.

Pittsburgh Plate Glass Co., 235 East Pittsburgh Avenue, Milwaukee, contemplates erection of new resin and varnish factory to cost \$180,000. Project is additional to new buildings being completed at cost of more than \$600,000. E. D. Griffin is general manager at Milwaukee.

Milwaukee Road, F. M. Sloane, division engineer, Union Station, Milwaukee, has placed general contract with Hunzinger Construction Co., 1827 North Thirtieth Street, for remodeling and enlarging main roundhouse in West Milwaukee at estimated cost of \$50,000.

A. Cohen & Son, 1231 North Fifth Street, Milwaukee, dealers in scrap metals, have plans by Richard E. Oberst, Inc., local architect, for addition for non-ferrous metal storage and handling, and including offices, to cost about \$30,000.

Marathon Paper Mills Co., Rothschild, Wis., has accepted bid of James Leck Co., 211 South Eleventh Street, Minneapolis, for erection of addition, 60 x 250 ft., two stories and basement, to waxing building of paper mill at Menasha, Wis. Grover Keeth is chief engineer.

J. I. Case Co., Racine, Wis., manufacturer of tractors and general farm machinery, has purchased idle plant of Showers Brothers Furniture Co. at Burlington, Iowa, and 30-acre site, and will begin at once on re-equipment program. Factory contains 250,000 sq. ft. and cost nearly \$1,000,000 when built in 1917.

◀ PACIFIC COAST ▶

Western Can Co., Seventeenth and Rhode Island Streets, San Francisco, has let general contract to Barrett & Hilp, 918 Harrison Street, for one-story addition, 86 x 200 ft. Cost close to \$100,000 with equipment. Leland S. Rosener, 233 Sansome Street, is architect and engineer.

Quartermaster Supply Office, Fort Mason, San Francisco, asks bids until April 26 for four 1000-gal., one 2000-gal., and one 750-gal. steel gasoline tanks and six gasoline pumping units (Proposal 928-363).

Pacific Gas Radiator Co., 7615 Roseberry Avenue, Huntington Park, Los Angeles, has plans for one-story addition, 66 x 140 ft., primarily for storage and distribution. Cost about \$45,000 with equipment. W. M. Bostock, 6221 Pacific Boulevard, Huntington Park, is engineer.

Commanding Officer, Ordnance Depot, Ogden, Utah, asks bids until May 7 for one blast machine (Circular 3); until May 12, for two steam-jacketed hoppers (Circular 4).

Del Mar Canning Co., 756 Ocean View Avenue, Monterey, Cal., canner and packer of food products, has approved plans for one-story canning plant, 130 x 250 ft., with two-story storage and distributing building, to replace plant destroyed by fire a few months ago. Cost close to \$230,000 with equipment. Morris Matheson will be in charge of construction.